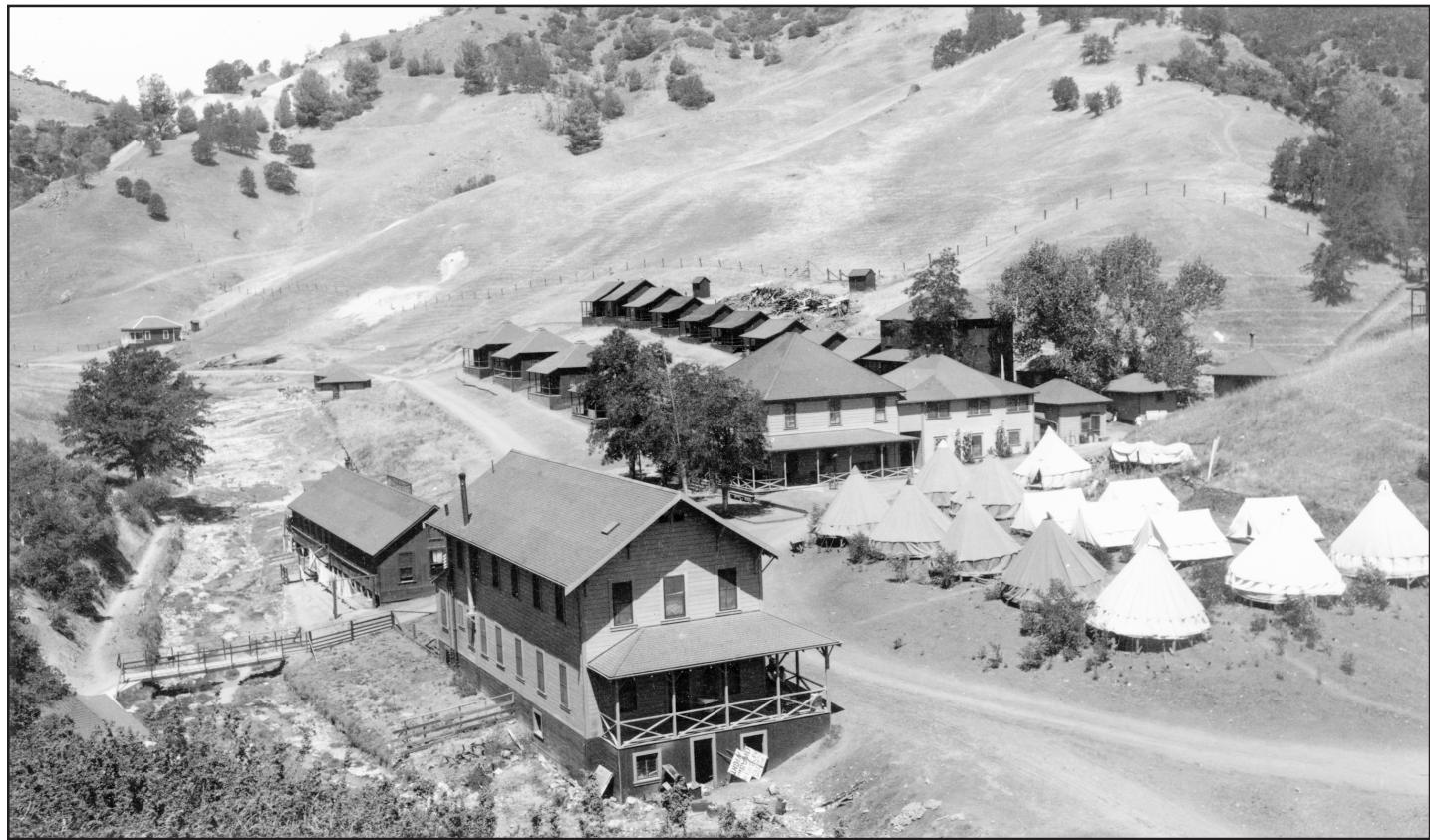


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*Geochemical Data on Waters,
Gases, Rocks, and Sediments from
The Geysers–Clear Lake Region, California
(1991–2000)*



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Cover: Photo taken July 7, 1910, of the Wilbur Hot Springs resort looking northwest up Sulphur Creek. The concrete and wood building flanked by trees on the right (north) side of the dirt road is still in use by the current resort operators. All other buildings, tents, and structures are gone or replaced, including bathhouses bordering the creek. The discolored area along the creek beyond the buildings consists of algae and deposits from the main hot springs (original photo by G. A. Waring, U.S. Geological Survey).

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*Geochemical Data on Waters,
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(1991–2000)*

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Fraser Goff, Deborah Bergfeld, Cathy J. Janik,
Dale Counce, and J. A. Stimac

ABSTRACT

This report tabulates an extensive geochemical database on waters, gases, rocks, and sediments from The Geysers–Clear Lake region, northern California. The samples from which the data were obtained were collected and analyzed during 1991 to 2000. These data provide useful information for ongoing and future investigations on geothermal energy, volcanism, ore deposits, environmental issues, and groundwater quality in this region.

INTRODUCTION

The Geysers–Clear Lake region is located roughly 100 to 200 km north of San Francisco in the northern California Coast Ranges. This region contains the largest commercial geothermal field in the world at The Geysers. Many other geothermal sites and prospects of potential commercial interest occur here (White et al., 1971; Goff et al., 1977; Beall, 1985; Donnelly-Nolan et al., 1993; Goff et al., 1995). The region also contains numerous mercury mines and prospects, probably related to Quaternary volcanic activity in the northern California Coast Ranges (Becker, 1888; Averitt, 1945; Bailey, 1946; Yates and Hilpert, 1946; White and Roberson, 1962; Hulen and Walters, 1993; Sherlock et al., 1995). Although now abandoned, mines such as Sulphur Bank Mine were once among the largest producers of mercury in the United States. One of these old mines, the Manhattan mercury mine, later became the McLaughlin open pit gold mine (Lehrman, 1986). Other abandoned mines have relict dumps and tailings piles that are potential environmental hazards. The region also contains one of the most interesting and complex assemblages of hot springs, mineral springs, and gas vents in the United States (Waring, 1915). These manifestations have been extensively studied to understand origins of natural fluids and their relations to ore deposits, volcanism, and source rock interactions (White, 1957, 1968; White et al., 1973; Barnes et al., 1972; 1973a; 1973b).

The authors have been engaged in a series of geothermal and environmental investigations in The Geysers–Clear Lake region since 1991 (Bergfeld, 2001; Bergfeld et al., 2001; Goff and Guthrie, 1999; Goff and Janik, 1993; Goff et al., 1993a, 1993b,

1995, 2000; Janik et al., 1994, 1999, 2000; Stimac et al., 1997, 2001). During these investigations, large quantities of unpublished chemical and isotopic data on waters, gases, rocks, and sediments have accumulated. Because this data may be useful to other research groups and interested regional stakeholders, we are releasing this information into the public domain. This report contains the locations, field measurements, and analytical results of these accumulated data. No attempt is made herein to interpret the scientific meaning of these data.

PROJECTS SUMMARY

The following projects were responsible for production of the data included in this report:

1. Geothermal studies funded by the U.S. Department of Energy, Office of Geothermal Technologies for the Hot Dry Rock program conducted by Los Alamos National Laboratory (1991 to 1994).
2. Geothermal studies funded by the U.S. Department of Energy, Office of Geothermal Technologies for projects on advanced chemical and isotopic research conducted by the U.S. Geological Survey and Los Alamos National Laboratory. This project focused on several domestic geothermal sites including The Geysers–Clear Lake region (1993 to 2001).
3. A pilot environmental study on the transport of mercury and other metals from mine tailings and related hot springs in the Sulphur Creek mining district near Wilbur hot springs (1994 to 1995).
4. A detailed investigation of surface changes at the Anderson Hot Springs area funded by the U.S. Department of Energy, Office of Geothermal Technologies (1998 to 2001).
5. An environmental study of the Sulphur Bank Mercury Mine funded by the U.S. Environmental Protection Agency (2000 to 2001).

These projects also supported the geothermal research efforts of J. Stimac and D. Bergfeld conducted from 1992 to 2001.

LOCATIONS AND FIELD PARAMETERS

All analytical data are keyed to sample numbers that are listed as initial entries in most of the tables. Latitudes and longitudes of sampling sites appear in Table 1, and the sites are shown on the regional map of Figure 1. Table 1 also provides the sampling date, name of the general sampling region, the name of the 7.5-minute topographic quadrangle in which the site occurs, the elevation, temperature, field pH, flow rate, and other useful information for each sampling site. Temperatures were measured with thermocouples and digital thermometers, and most field pH was measured with pH-sensitive papers. Samples from Sulphur Creek and Hopland areas (SC94 and CLH96 samples, respectively) were measured with a pH electrode. Flow rates were generally measured with a bucket or beaker and a stopwatch.

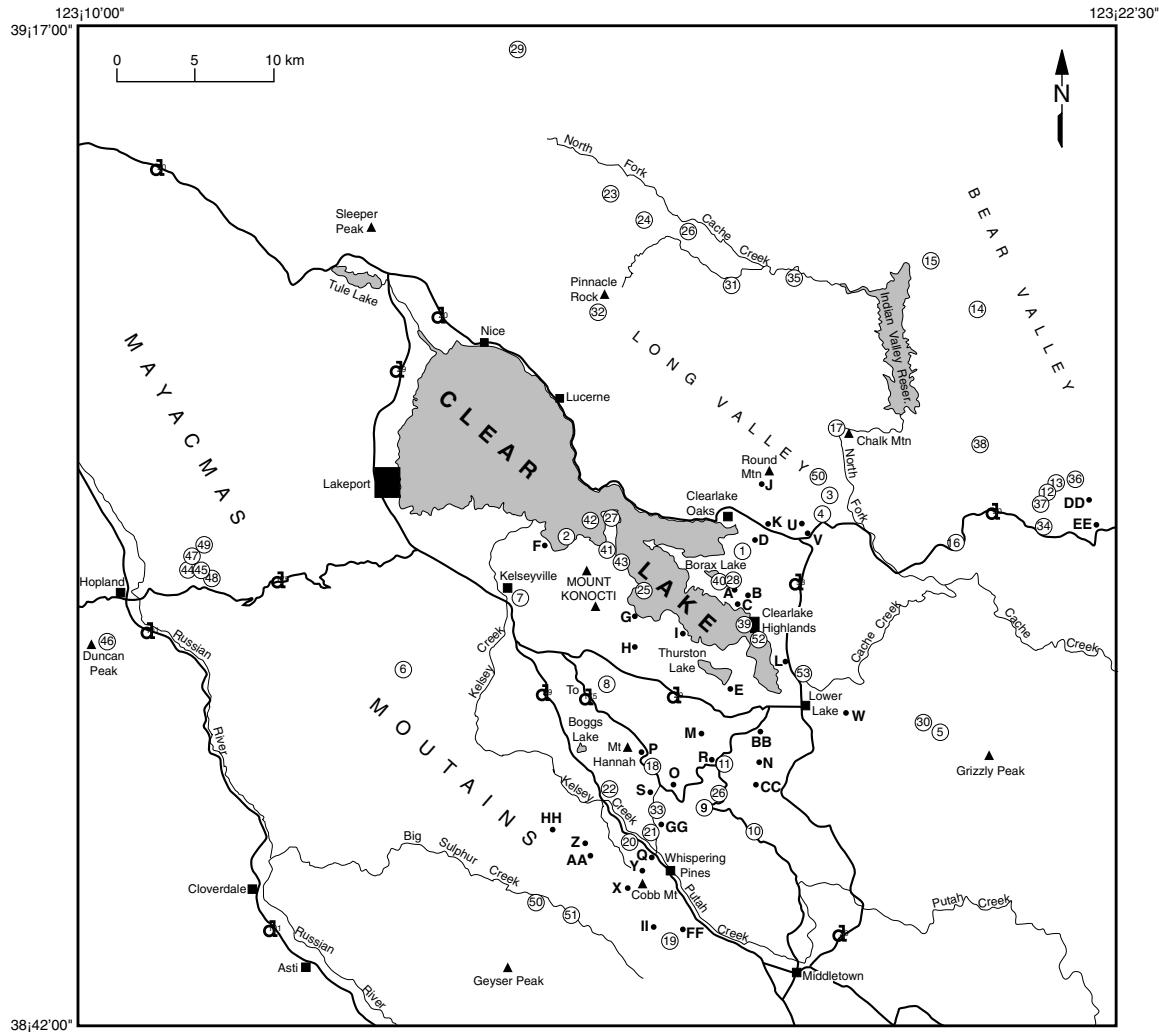


Figure 1: Regional map of The Geysers–Clear Lake region, California, showing the locations of samples (Tables 1 and 8). Numbers with circles show water, gas, and sediment sample locations, and bold letters show rock sample locations.

SAMPLING METHODS

Waters: Field procedures for sampling waters have been described in detail by Trujillo et al. (1987), Werner et al. (1997), and Goff and McMurtry (2000). Generally, four basic samples are collected at each water sampling site: (1) a 125-ml plastic bottle of filtered ($0.45 \mu\text{m}$), unacidified water for anions, (2) a 125-ml plastic bottle of filtered ($0.45 \mu\text{m}$) water, acidified to $\text{pH} \leq 2$ with spectrographically pure, concentrated HNO_3 for cations, silica, and trace metals, (3) a 30-ml glass bottle of raw water for deuterium and oxygen-18 isotope measurements, and (4) a 500-ml glass or plastic bottle of raw water for tritium measurements. Sampling for trace metals analysis followed a clean-hands protocol in order to avoid introduction of contaminants. Samples were collected in precleaned, acid-washed (nitric acid) bottles and preserved with trace metal grade reagents.

Additional samples are collected for other kinds of analyses but were not collected at each sampling point or for all projects. For sulfide analysis, a 60-ml plastic bottle of raw sample water was collected, and two pellets of NaOH were added. Mercury samples for projects at the Sulphur Creek mining district, the Sulphur Bank mercury mine, and the Anderson Springs area were collected by filling a 250-ml prewashed glass bottle with filtered (0.45 μm) or raw water and adding 2 ml of 20% $\text{K}_2\text{Cr}_2\text{O}_7$ (weight per volume) prepared in 1:1 trace-metal-grade HNO_3 . Gold samples for the Sulphur Creek project were collected by filling a 250-ml prewashed glass bottle with filtered water and adding 2 ml of aqua regia (a 3:1 mixture of trace-metal-grade HCl and HNO_3). Samples for determination of monomeric aluminum species were collected following the MIBK procedure of Barnes (1975). Samples for carbon-13 analysis of dissolved inorganic carbon were collected by filling a 125- to 250-ml glass bottle with raw water and adding a saturated solution (in most cases 10 ml) of SrCl_2 in NH_4OH .

Gases: Gas samples were obtained at fumaroles, gas vents, gaseous springs and gas-rich wells with funnels, pipes, tubing, and fittings as necessary. Gases were collected in either 300-ml double-port, caustic-gas bottles or 125-ml double-stop cock, flow-through gas bottles as described by Trujillo et al. (1987), Fahlquist and Janik (1992), and Goff and McMurtry (2000). Because geothermal samples in The Geysers–Clear Lake region are rich in CO_2 and other soluble constituents, caustic-gas bottles are preferred. Caustic-gas bottles are prepared in the laboratory before sampling by adding roughly 100 ml of 4N NaOH solution (bicarbonate purged) to the bottle and pumping the remaining head space of the bottle to vacuum. Samples collected in caustic bottles can be used for bulk gas analysis and analysis of $\delta^{13}\text{C}-\text{CO}_2$, $\delta^{13}\text{C}-\text{CH}_4$, and other isotopic constituents.

Rocks and Sediments: Samples of representative volcanic, plutonic, metamorphic, and sedimentary rocks from The Geysers–Clear Lake region were identified using geologic maps (Goff and McLaughlin, 1976; McLaughlin, 1978; McLaughlin et al., 1989; Hearn et al., 1995) and collected in cloth or plastic bags for later chemical and isotopic analysis. Soft sediment samples for chemical analysis were collected into plastic bags using plastic scoops.

ANALYTICAL METHODS, RESULTS, AND CALCULATIONS

Waters: Major and trace element chemical analyses of waters were determined by D. Counce at Los Alamos National Laboratory using methods listed in Table 2 (see Janik et al., 1999, for detailed descriptions of some current methods). Results of the analyses are given in Tables 3 and 4. Isotope analyses of $\delta\text{D}-\text{H}_2\text{O}$, $\delta^{18}\text{O}-\text{H}_2\text{O}$, and $\delta^{13}\text{C}-\text{HCO}_3$ were determined by standard methods at various laboratories listed in Table 5. Tritium measurements were obtained primarily from the University of Miami. All isotope results on water samples are reported in Table 5.

Gases: Bulk gas analyses (Table 6) were obtained from either the U.S. Geological Survey by C. J. Janik or the Los Alamos National Laboratory by D. Counce using methods listed in Table 2. Carbon-13 analyses of CO_2 and CH_4 were determined using standard methods at a variety of laboratories as listed in Table 6.

Chemical Geothermometers: Water and gas analyses were used to estimate subsurface geothermal reservoir temperatures (Table 7) using a standard suite of chemical

geothermometers that are referenced at the bottom of the table. Calculations were performed on a personal computer using the code of Urbani (1986).

Rocks: About 1 kg of each sample was cleaned of weathering and oxidation and crushed by various means to roughly -80 mesh. Samples were further crushed and homogenized in 15- to 20-g portions in a precontaminated tungsten-carbide shatterbox. Sample splits were heated at 110°C for 4 h and then allowed to equilibrate at ambient laboratory conditions for 12 h. One-gram splits were then mixed with 9 grams of lithium tetraborate flux and heated in a muffle furnace for 1 hour at 1100°C to obtain fusion disks. Major and trace elements were analyzed using an automated Rigaku wavelength-dispersive x-ray fluorescence (XRF) spectrometer. Elemental concentrations were calculated by comparing x-ray intensities of the samples to those for 21 standards of known composition using “consensus values” from Govindaraju (1994). Intensities were reduced using a commercial fundamental parameters program for matrix corrections to determine the concentrations listed in Table 8. Isotope measurements of $\delta^{18}\text{O}$ and $^{87/86}\text{Sr}$ were determined on splits of the crushed rock by standard methods at contract laboratories (Table 9).

Sediments: About 0.25 g of dried sediment was mixed with a cocktail of HNO_3 , HCl , and HF, heated in a microwave oven for about 10 minutes, and the resulting solution adjusted to 50 ml with deionized water before analysis of selected metals by methods described in Table 2. Results of the metals analyses appear in Table 10. The exact composition of the acid cocktail is described at the bottom of the table. This method extracts easily soluble metallic minerals and colloid particles from the sediments without dissolving all the rock fragments, sand grains, and silt.

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Table 1: Sample numbers, names, sampling dates, locations, and field parameters for the samples presented in this report.

Sample No.	Location	Date	Area ^a	Map No. ^a	USGS 7.5 Minute Quad	Latitude	Longitude	Elevation (m)	Temp (°C) ^b	pH (field) ^b	Flow (l/min) ^b	Sampling Point; Comments
<i>The Geysers - Clear Lake Region, General Locations</i>												
CL93-45	Adams Spring	05/04/93	S Clear Lake	33	Whispering Pines	38° 51' 17"	122° 43' 12"	829	15	6.5	seep	Pavilion ruins
CL91-27	Adrienne's Well	03/13/91	Clear Lake	27	Lucern	39° 01' 16"	122° 45' 15"	420	11.2	6.8	0-40	Faucet by house
CL91-8	Ag. Park Well #3	03/08/91	S Clear Lake	8	Kelseyville	38° 55' 58"	122° 45' 34"	640	65.7	5.8	0-300	Manhole by well
CL92-37	Allen Spring	06/03/92	BSFZ	31	Bartlett Springs	39° 09' 38"	122° 39' 54"	579	17	6.0	10	During low creek flow
CL91-5	Baker Soda Spring	03/07/91	SE Clear Lake	5	Lower Lake	38° 53' 31"	122° 31' 53"	427	21.3	6.8	1	Pool, travertine summit
CL92-29	Baker Soda Spring	06/02/92	SE Clear Lake	5	Lower Lake	38° 53' 31"	122° 31' 53"	427	23.6	7.0	1	Pool, travertine summit
CL96-6	Baker Soda Spring	06/17/96	SE Clear Lake	5	Lower Lake	38° 53' 31"	122° 31' 53"	427	22.2	6.5	1	Pool, travertine summit
CL91-14	Barrel Spring	03/09/91	BSFZ	14	Leesville	39° 08' 56"	122° 28' 44"	720	10.8	6.8	1	From source
SBM95-8	Big Mother Spring in Clear Lake	09/13/95	Clear Lake	42	Lucern	39° 00' 56"	122° 46' 49"	404	22.0	na	unknown	Gas sample only
CL91-2	Big Soda Spring	03/06/91	Clear Lake	2	Lucern	39° 00' 33"	122° 47' 15"	404	31.3	5.8	50	Concrete crib, low lake level
CL92-42	Big Soda Spring	06/04/92	Clear Lake	2	Lucern	39° 00' 33"	122° 47' 15"	404	31	6.0	40	Concrete crib, low lake level
CL91-28	Borax Gas Seep	03/14/91	E Clear Lake	28	Clearlake Highlands	38° 59' 10"	122° 40' 05"	410	10	na	na	From plastic pipe in ground
CL93-71	Borax Gas Seep	12/07/93	E Clear Lake	28	Clearlake Highlands	38° 59' 10"	122° 40' 05"	410	nm	na	na	From plastic pipe in ground
CL95-4	Borax Gas Seep	03/31/95	E Clear Lake	28	Clearlake Highlands	38° 59' 10"	122° 40' 05"	410	11.3	na	na	From plastic pipe in ground
CL93-70	Borax Lake	12/07/93	E Clear Lake	40	Clearlake Highlands	38° 59' 07"	122° 40' 29"	404	10	10.2	na	Southeast shore
CL91-17	Chalk Mt. Spring	03/09/91	BSFZ	17	Benmore Canyon	39° 04' 23"	122° 34' 38"	390	16.1	6.8	1	Solitary bubbling spring
CL92-31	Chalk Mt. Spring	06/02/92	BSFZ	17	Benmore Canyon	39° 04' 23"	122° 34' 38"	390	21	6.5	seep	Solitary bubbling spring
CL93-68	Chalk Mt. Spring	12/06/93	BSFZ	17	Benmore Canyon	39° 04' 23"	122° 34' 38"	390	17	6.5	seep	Solitary bubbling spring
CL91-25	Clear Lake, Konocti Bay	03/13/91	Clear Lake	25	Clearlake Highlands	38° 57' 01"	122° 38' 28"	404	10.2	6.8	na	Lake shore
CL93-69	Clear Lake, city of Clearlake	12/07/93	Clear Lake	39	Clearlake Highlands	38° 59' 28"	122° 44' 22"	404	12	6.0	na	City park fishing pier
SBM97-5	Clear Lake, Clearlake Highlands	11/16/97	Clear Lake	52	Clearlake Highlands	38° 56' 45"	122° 38' 07"	404	13.3	8.1	na	Lake shore
CL91-3	Cold Spring near Cross Spring	03/07/91	E Clear Lake	3	Benmore Canyon	39° 01' 40"	122° 35' 09"	451	9	6.0	60	Near paved road
CL91-15	Complexion Spring	03/09/91	BSFZ	15	Hough Spring	39° 10' 30"	122° 30' 43"	518	8.9	11.5	seep	From source
CL92-36	Complexion Spring	06/03/92	BSFZ	15	Hough Spring	39° 10' 30"	122° 30' 43"	518	19.1	12.0	seep	From source
CL96-2	Complexion Spring	06/15/96	BSFZ	15	Hough Spring	39° 10' 30"	122° 30' 43"	518	15.0	10.0	seep	From source
CLH96-4	Coppage Spring	08/22/96	Hopland	47	Hopland	38° 59' 13"	123° 03' 31"	200	19	6.3	0 at surface	Pit in travertine
CL92-39	Crabtree Gas Seep	06/03/92	BSFZ	29	Potato Hill	39° 17' 27"	122° 49' 18"	698	28	6.0	0	Gas only, bubbling river
CL95-13	Crabtree Gas Seep	07/21/95	BSFZ	29	Potato Hill	39° 17' 27"	122° 49' 18"	698	29	5	15	Gas only, bubbling river
CL92-40	Crabtree Hot Spring	06/03/92	BSFZ	29	Potato Hill	39° 17' 27"	122° 49' 18"	698	42	7.0	nm	Main spring, concrete crib
CLH96-3	Duncan Soda Spring	08/21/96	Hopland	46	Yorkville	38° 56' 50"	123° 07' 40"	280	16	6.7	nm	Also called Duncan Spring
CL91-9	Ettawa Spring	03/08/91	S Clear Lake	9	Whispering Pines	38° 51' 02"	122° 41' 23"	591	21.7	6.5	2	From pipe near gazebo
CL91-24	Gas Spring	03/12/91	BSFZ	24	Bartlett Springs	39° 11' 18"	122° 41' 46"	759	10.0	5.8	4 total area	From source
CL95-7	Gas Spring	04/01/95	BSFZ	24	Bartlett Springs	39° 11' 18"	122° 41' 46"	759	10	5	2	From source
CL97-1	Gas Spring	06/13/97	BSFZ	24	Bartlett Springs	39° 11' 18"	122° 41' 46"	759	17.1	4.5	2	From source
CL91-20	Gordon Cold Spring	03/11/91	S Clear Lake	20	Whispering Pines	38° 49' 59"	122° 44' 15"	735	9.0	6.5	60	Near house
CL92-43	Gordon Cold Spring	06/04/92	S Clear Lake	20	Whispering Pines	38° 49' 59"	122° 44' 15"	735	15.5	7.0	40	Near house
CL91-21	Gordon Warm Spring	03/11/91	S Clear Lake	21	Whispering Pines	38° 50' 05"	122° 43' 53"	732	34.6	6.8	4	From source
CL91-16	Grizzly Spring	03/09/91	BSFZ	16	Wilbur Springs	39° 00' 12"	122° 29' 50"	384	19.4	7.0	2	Concrete crib, top of travertine
CL92-32	Grizzly Spring	06/02/92	BSFZ	16	Wilbur Springs	39° 00' 12"	122° 29' 50"	384	20.9	6.8	0.25	Concrete crib, top of travertine
CL95-8	Grizzly Spring	07/17/95	BSFZ	16	Wilbur Springs	39° 00' 12"	122° 29' 50"	384	21.5	7.5	0.5	Concrete crib, top of travertine
CL97-6	Grizzly Spring	06/18/97	BSFZ	16	Wilbur Springs	39° 00' 12"	122° 29' 50"	384	22	nm	0.5	Concrete crib, top of travertine
CL98-1	Highland Springs Reservoir	09/09/98	W Clear Lake	6	Highland Springs	38° 56' 21"	122° 54' 23"	448	22.4	nm	nm	Gas vent, southeast shore
CL91-4	Hog Hollow Spring	03/07/91	E Clear Lake	4	Benmore Canyon	39° 01' 19"	122° 35' 31"	439	30.0	6.0	8	From source
CL92-35	Hog Hollow Spring	06/02/92	E Clear Lake	4	Benmore Canyon	39° 01' 19"	122° 35' 31"	439	29.1	6.0	8	From source
CL95-16	Hog Hollow Spring	07/24/95	E Clear Lake	4	Benmore Canyon	39° 01' 19"	122° 35' 31"	439	31	5.5	8	From source
CL97-5	Hog Hollow Spring	06/18/97	E Clear Lake	4	Benmore Canyon	39° 01' 19"	122° 35' 31"	439	30.1	nm	8	From source
CL95-14	Horseshoe Spring	07/23/95	Clear Lake	43	Clearlake Highlands	38° 59' 39"	122° 44' 35"	404	40	6.5	unknown	Water collected from hot tub
CL97-4	Horseshoe Spring	06/18/97	Clear Lake	43	Clearlake Highlands	38° 59' 39"	122° 44' 35"	404	40.8	nm	unknown	Upwelling by lake water
GYS95-2	Hot Springs Creek	08/08/95	Geysers	43	The Geysers	39° 47' 22"	122° 46' 41"	576	95.2	7.0	na	Gas vent in creek
CL93-50	Hough Spring	05/06/93	BSFZ	35	Hough Spring	39° 09' 43"	122° 36' 44"	485	14	6.2	seep	Travertine west of ruins
CL91-26	Howard Spring	03/13/91	S Clear Lake	26	Whispering Pines	38° 51' 29"	122° 40' 24"	659	46.3	6.5	14	Main spring in bath house
CL91-11	Joe's Spring	03/08/91	S Clear Lake	11	Clearlake Highlands	38° 52' 35"	122° 40' 34"	622	13.6	6.0	2	Basin along side of road
CL91-7	Kelseyville Methane Well	03/08/91	W Clear Lake	7	Kelseyville	38° 58' 37"	122° 49' 53"	428	10.4	na	na	Gas vent on hill by old well
CL95-1	Kelseyville Methane Well	03/30/95	W Clear Lake	7	Kelseyville	38° 58' 37"	122° 49' 53"	428	13.7	na	na	Gas vent on hill by old well
CL97-3	Kelseyville Methane Well	06/17/97	W Clear Lake	7	Kelseyville	38° 58' 37"	122° 49' 53"	428	nm	na	na	Gas vent on hill by old well
CL93-72	Little Borax Lake	12/07/93	Clear Lake	41	Lucern	39° 00' 13"	122° 45' 13"	405	11	8.5	na	Shore closest to club house

Table 1: Continued

Sample No.	Location	Date	Area ^a	Map No. ^a	USGS 7.5 Minute Quad	Latitude	Longitude	Elevation (m)	Temp (°C) ^b	pH (field) ^b	Flow (l/min) ^b	Sampling Point; Comments
GYS95-3	Little Geysers	08/08/95	Geysers	51	The Geysers	38° 46' 00"	122° 44' 54"	747	98.3	5.0	na	Along creek
GYS95-4	Little Geysers in Stream	08/08/95	Geysers	43	The Geysers	39° 47' 09"	122° 46' 49"	550	95.8	5.0	na	Below hot spring terrace
SBM95-9	Little Soda Spring	09/13/95	Clear Lake	2	Lucern	39° 00' 33"	122° 47' 15"	404	32.0	5.9	2	North end of island
CLH96-6	Lucchetti "Bad Water" Well	08/22/96	Hopland	49	Hopland	38° 59' 35"	123° 03' 14"	245	19.5	6.0	pumped	Faucet by wellhead
CL92-30	Mayfield Well	06/02/92	SE Clear Lake	30	Lower Lake	38° 53' 33"	122° 32' 04"	420	17.3	6.5	0-100	Faucet by wellhead
CL91-18	New Ciardella Well	03/11/91	S Clear Lake	18	Clearlake Highlands	39° 52' 33"	122° 43' 37"	800	10.7	6.5	0-100	Faucet by wellhead
CL93-49	New Ciardella Well	05/05/93	S Clear Lake	18	Clearlake Highlands	38° 52' 33"	122° 43' 37"	800	15	6.5	0-400	Faucet by wellhead
CL91-23	Newman Spring I	03/12/91	BSFZ	23	Bartlett Springs	39° 11' 53"	122° 42' 54"	585	29.0	6.8	10 total	Springs upstream of main site
CL92-38	Newman Spring II	06/03/92	BSFZ	23	Bartlett Springs	39° 11' 55"	122° 42' 46"	581	29	6.5	5	Main spring
GYS95-1	Old Geysers	08/08/95	Geysers	50	The Geysers	38° 48' 00"	122° 48' 13"	442	98.7	7.0	na	Main site, old geysers resort
CL92-41	Pinnacle Rock Spring	06/03/92	E Clear Lake	32	Bartlett Mountain	39° 08' 08"	122° 46' 18"	1128	13	6.5	12	Culvert, Bartlett Springs Road
CLH96-1	Reeve's 2 Well	08/21/96	Hopland	44	Hopland	38° 59' 08"	123° 03' 38"	258	18.5	7.3	pumped	Faucet by wellhead
CL91-10	Spiers Spring	03/08/91	S Clear Lake	10	Whispering Pines	38° 49' 49"	122° 36' 51"	412	24.2	6.2	5	Spring by serpentine cliff
CL91-22	Sulphur Creek Spring	03/11/91	S Clear Lake	22	The Geysers	38° 51' 41"	122° 45' 15"	854	21	6.0	5	Springs by creek
CL95-12	Sulphur Creek Spring	07/19/95	S Clear Lake	22	The Geysers	38° 51' 41"	122° 45' 15"	854	29	6	5	Springs by creek
CL95-11	Sulphur Mound Mine	07/19/95	S Clear Lake	8	Kelseyville	38° 55' 44"	122° 45' 27"	560	20	na	0	Gas only, cracks in tuff
CL97-2a	Sulphur Mound Mine	06/17/97	S Clear Lake	8	Kelseyville	38° 55' 44"	122° 45' 27"	560	nm	na	0	Gas only, cracks in tuff
CL97-2b	Sulphur Mound Mine	06/17/97	S Clear Lake	8	Kelseyville	38° 55' 44"	122° 45' 27"	560	nm	na	0	Gas only, cracks in tuff
CLH96-2	Tribal 1 Well	08/21/96	Hopland	45	Hopland	38° 59' 06"	123° 03' 16"	232	18.5	6.9	pumped	Faucet by well head
CLH96-5	Vintage Well	08/22/96	Hopland	48	Hopland	38° 58' 46"	123° 02' 50"	255	21	6.5	pumped	Faucet by well head
Anderson Springs Area												
CL91-19	Anderson Hot Spring	03/11/91	SE Geysers	19	Whispering Pines	38° 46' 20"	122° 42' 23"	488	49.4	5.5	3 total area	Main spring; faulted argillite
CL92-44	Anderson Hot Spring	06/04/92	SE Geysers	19	Whispering Pines	38° 46' 20"	122° 42' 23"	488	48	6.0	3 total area	Main spring; faulted argillite
CL95-2	Anderson Hot Spring	03/30/95	SE Geysers	19	Whispering Pines	38° 46' 20"	122° 42' 23"	488	76.7	6.3	3 total area	Main spring; faulted argillite
CL98-3	Anderson Hot Spring	09/10/98	SE Geysers	19	Whispering Pines	38° 46' 20"	122° 42' 23"	488	68.0	6.0	2 total area	Main spring; faulted argillite
CL98-5	Anderson Hot Spring	12/04/98	SE Geysers	19	Whispering Pines	38° 46' 20"	122° 42' 23"	488	50.4	6.2	nm	Secondary spring in bank
And99-2	Anderson Hot Spring	08/19/99	SE Geysers	19	Whispering Pines	38° 46' 20"	122° 42' 23"	488	69.5	6.0	1.5	Main spring; faulted argillite
CL98-2	Anderson, New Hot Spring	09/10/98	SE Geysers	19	Whispering Pines	38° 46' 21"	122° 42' 23"	488	90.4	6.0	0.5	Creek 40 m NW of main site
And99-1	Anderson, New Hot Spring (gas only)	08/19/99	SE Geysers	19	Whispering Pines	38° 46' 21"	122° 42' 23"	488	98.4	nm	nm	Creek 40 m NW of main site
And99-4	Anderson, New Hot Spring	08/20/99	SE Geysers	19	Whispering Pines	38° 46' 21"	122° 42' 23"	488	98.4	5.5	2.3	Creek 40 m NW of main site
No number	Anderson, New Hot Spring	09/16/99	SE Geysers	19	Whispering Pines	38° 46' 21"	122° 42' 23"	488	99.5	6.5	nm	Creek 40 m NW of main site
And99-5	Creek, below hot springs	08/20/99	SE Geysers	19	Whispering Pines	38° 46' 26"	122° 42' 22"	473	20.5	6.0	45.5	At collapsed mine adit
And99-3	Fe-rich Spring	08/19/99	SE Geysers	19	Whispering Pines	38° 46' 20"	122° 42' 29"	518	21.1	6.0	nm	Upstream of 'hot creek'
CL98-4	Schwartz Mine Adit	12/04/98	SE Geysers	19	Whispering Pines	38° 46' 19"	122° 41' 26"	476	22.0	6.0	4.5	From mouth of adit
And99-6	Schwartz Mine Adit	08/20/99	SE Geysers	19	Whispering Pines	38° 46' 22"	122° 42' 27"	476	18.8	5.5	11.4	From mouth of adit
And99-8	Schwartz Mine Adit	10/05/99	SE Geysers	19	Whispering Pines	38° 46' 19"	122° 41' 26"	476	24.1	6.2	9.1 to 13.6	From mouth of adit
And99-7	Drainage from 99-6	08/20/99	SE Geysers	19	Whispering Pines	38° 46' 23"	122° 41' 23"	439	12.4	4.5	11.4	About 100 m up from road
Sulphur Bank Mine Area												
SBM95-6	Basalt (North) Pit	09/12/95	Oaks Arm	1	Clearlake Oaks	39° 00' 18"	122° 39' 56"	404	25.0	2.8	na	Evaporated, bubbling pool
SB99-2	Basalt (North) Pit	08/17/99	Oaks Arm	1	Clearlake Oaks	39° 00' 18"	122° 39' 56"	404	22.1	3.0	na	Evaporated, bubbling pool
SB99-1	Basalt (North) Pit Spring	08/17/99	Oaks Arm	1	Clearlake Oaks	39° 00' 18"	122° 39' 56"	404	25.7	3.0	0.25	Cold, geysering spring
SB99-15	Clear Lake, Middle Rip Rap, SBM	08/18/99	Oaks Arm	1	Clearlake Oaks	39° 00' 12"	122° 40' 14"	404	26.2	6.5	na	Lake water 2 m from shore
SBM97-3	Clear Lake, N. Rip Rap, SBM	11/11/97	Oaks Arm	1	Clearlake Oaks	39° 00' 18"	122° 40' 16"	404	15.9	8.5	na	Lake water 2 m from shore
SB99-13	Clear Lake, N. Rip Rap, SBM	08/18/99	Oaks Arm	1	Clearlake Oaks	39° 00' 18"	122° 40' 16"	404	24.8	6.3	na	Lake water 2 m from shore
SBM95-4	Clear Lake, S. Rip Rap, SBM	09/12/95	Oaks Arm	1	Clearlake Oaks	39° 00' 07"	122° 40' 13"	404	25.1	6.2	na	Lake water 2 m from shore
SBM97-4	Clear Lake, S. Rip Rap, SBM	11/11/97	Oaks Arm	1	Clearlake Oaks	39° 00' 07"	122° 40' 13"	404	15.6	7.5	na	Lake water 2 m from shore
SB99-16	Clear Lake, S. Rip Rap, SBM	08/18/99	Oaks Arm	1	Clearlake Oaks	39° 00' 07"	122° 40' 13"	404	26.2	6.5	na	Lake water 2 m from shore
CL93-59	Dry vent on embankment near leaking well	12/04/93	Oaks Arm	1	Clearlake Oaks	39° 00' 15"	122° 39' 48"	405	20	nm	na	Crack near haul road
SB99-5	Dry vent 30 m E of leaking geothermal well	08/17/99	Oaks Arm	1	Clearlake Oaks	39° 00' 16"	122° 39' 47"	405	35.4	nm	na	Small vent in ground
SB99-7	Dry vent, by E end of crib, leaking well	08/17/99	Oaks Arm	1	Clearlake Oaks	39° 00' 16"	122° 39' 47"	405	32.2	nm	na	Small vent in ground
SBMM00-1	Dry vent adjacent to leaking well	12/01/00	Oaks Arm	1	Clearlake Oaks	39° 00' 16"	122° 39' 47"	405	13.3	nm	na	Small vent in ground
SBMM00-2	Dry vent base of embankment by leaking wel	12/01/00	Oaks Arm	1	Clearlake Oaks	39° 00' 15"	122° 39' 48"	405	34.8	nm	na	Crack near haul road
CL93-64	Frog Pond (Green Bubbling Pool)	12/05/93	Oaks Arm	1	Clearlake Oaks	39° 00' 14"	122° 39' 27"	409	16	nm	na	Bubbling pond, SW shore
SBM95-7a	Frog Pond (Green Bubbling Pool)	09/12/95	Oaks Arm	1	Clearlake Oaks	39° 00' 14"	122° 39' 27"	409	25.6	5.0	na	Bubbling pond, SW shore
SB99-8	Green Pool	08/17/99	Oaks Arm	1	Clearlake Oaks	39° 00' 13"	122° 39' 33"	407	22.2	nm	na	Bubbling pond, S shore (gas)

Table 1: Continued

Sample No.	Location	Date	Area ^a	Map No. ^a	USGS 7.5 Minute Quad	Latitude	Longitude	Elevation (m)	Temp (°C) ^b	pH (field) ^b	Flow (l/min) ^b	Sampling Point; Comments
SB99-17	Green Pool	08/19/99	Oaks Arm	1	Clearlake Oaks	39° 00' 13"	122° 39' 33"	407	24.9	3.5	na	Bubbling pond, S shore
CL93-54	Herman Pit, east end	09/30/93	Oaks Arm	1	Clearlake Oaks	39° 00' 11"	122° 39' 54"	404	23.5	3.3	na	NE shore, near haul road
SBM97-1	Herman Pit, east end	11/11/97	Oaks Arm	1	Clearlake Oaks	39° 00' 11"	122° 39' 54"	404	17.2	3.0	na	NE shore, near haul road
SB99-11	Herman Pit, east end	08/17/99	Oaks Arm	1	Clearlake Oaks	39° 00' 11"	122° 39' 54"	404	24.8	3.5	na	NE shore, near haul road
CL93-55	Herman Pit, east end, near well crib	12/04/93	Oaks Arm	1	Clearlake Oaks	39° 00' 11"	122° 39' 54"	404	14	3.5	na	Gas vent; T/pH of pit water
CL93-56	Herman Pit, east end, 30 m W. of 55	12/04/93	Oaks Arm	1	Clearlake Oaks	39° 00' 11"	122° 39' 54"	404	14	3.5	na	Gas vent; T/pH of pit water
CL93-57	Herman Pit, east end, 25 m W. of 56	12/04/93	Oaks Arm	1	Clearlake Oaks	39° 00' 17"	122° 39' 45"	404	14	3.5	na	Gas vent; T/pH of pit water
SBM95-1	Herman Pit, east end, 45 m W. of well crib	09/11/95	Oaks Arm	1	Clearlake Oaks	39° 00' 11"	122° 39' 54"	404	23.4	3.5	na	Gas vent; T/pH of pit water
CL91-1	Herman Pit, site 4, near leaking well	03/06/91	Oaks Arm	1	Clearlake Oaks	39° 00' 16"	122° 39' 47"	404	10.1	na	na	Gas vent; T/pH of pit water
CL93-58	Herman Pit, site 4, near leaking well	12/04/93	Oaks Arm	1	Clearlake Oaks	39° 00' 16"	122° 39' 47"	404	14	3.5	na	Gas vent; T/pH of pit water
SB99-4	Herman Pit, site 4, near leaking well	08/17/99	Oaks Arm	1	Clearlake Oaks	39° 00' 16"	122° 39' 47"	404	24.4	3.5	na	Gas vent; T/pH of pit water
SB99-10	Herman Pit, site 4, near leaking well	08/17/99	Oaks Arm	1	Clearlake Oaks	39° 00' 16"	122° 39' 47"	404	24.8	3.5	na	Pit water
SBMM00-6	Herman Pit, site 4, near leaking well	12/03/00	Oaks Arm	1	Clearlake Oaks	39° 00' 16"	122° 39' 47"	404	13.1	3.3	na	Gas vent; T/pH of pit water
CL93-60	Herman Pit, 35 m W. of 58	12/04/93	Oaks Arm	1	Clearlake Oaks	39° 00' 17"	122° 39' 46"	404	14	3.5	na	Gas vent; T/pH of pit water
CL93-63	Herman Pit, west end	12/04/93	Oaks Arm	1	Clearlake Oaks	39° 00' 12"	122° 39' 57"	404	14	3.8	na	Pit water
SBM95-5	Herman Pit, west end	09/12/95	Oaks Arm	1	Clearlake Oaks	39° 00' 12"	122° 39' 57"	404	26.0	3.5	na	Pit water at overflow point
SBM97-2	Herman Pit, west end	11/11/97	Oaks Arm	1	Clearlake Oaks	39° 00' 12"	122° 39' 57"	404	17.6	2.9	na	Pit water at overflow point
SB99-9	Herman Pit, west end	08/17/99	Oaks Arm	1	Clearlake Oaks	39° 00' 12"	122° 39' 57"	404	24.8	3.5	na	Pit water at overflow point
CL93-62	Herman Pit, weak vent 75 m W. of 61	12/04/93	Oaks Arm	1	Clearlake Oaks	39° 00' 15"	122° 39' 49"	404	14	3.5	na	Gas vent; T/pH of pit water
SB99-6	Herman Pit, vent 50 m E of leaking well	08/17/99	Oaks Arm	1	Clearlake Oaks	39° 00' 11"	122° 39' 54"	404	24.4	3.3	na	Gas vent; T/pH of pit water
SB99-12	Rip-Rap Seep	08/18/99	Oaks Arm	1	Clearlake Oaks	39° 00' 12"	122° 40' 13"	404	22.8	5.5	0.05	Pit water leaking through bank
CL95-15	"Sister of Green Bubbling Pool"	07/24/95	Oaks Arm	1	Clearlake Oaks	39° 00' 15"	122° 39' 29"	408	26	3.5	na	Pool west of paved road
CL93-61	Well CL #1, leaking geothermal fluid	12/04/93	Oaks Arm	1	Clearlake Oaks	39° 00' 16"	122° 39' 47"	405	nm	na	sputtering	Old well head, leaking plug
SBM95-3	Well CL #1, leaking geothermal fluid	09/11/95	Oaks Arm	1	Clearlake Oaks	39° 00' 16"	122° 39' 47"	405	27.0	6.8	sputtering	Old well head, leaking plug
SB99-3	Well CL #1, leaking geothermal fluid	08/17/99	Oaks Arm	1	Clearlake Oaks	39° 00' 16"	122° 39' 47"	405	31.4	nm	sputtering	Old well head, leaking plug
SBMM00-5	Well CL #1, leaking geothermal fluid	12/01/00	Oaks Arm	1	Clearlake Oaks	39° 00' 16"	122° 39' 47"	405	13.6	6.5	shut in	Rebuilt well before abandoned
SBMM00-4	Well, flowing gas 150 m N of Herman Pit	12/01/00	Oaks Arm	1	Clearlake Oaks	39° 00' 17"	122° 39' 47"	409	cold	nm	shut in	Monitoring well; gas only
SBMM00-3	Well MW25D, gas bleed, 60 psig WHP	12/01/00	Oaks Arm	1	Clearlake Oaks	39° 00' 18"	122° 39' 27"	409	nm	na	Open well, gas only	
Sulphur Creek Mining District												
SC94-15	Bear Creek, downstream of Sulphur Creek	05/23/94	Wilbur	36	Wilbur Springs	39° 02' 22"	122° 24' 22"	369	26	7.5	≥300	About 50 m south of bridge
SC94-14	Bear Creek, upstream of Sulphur Creek	05/23/94	Wilbur	36	Wilbur Springs	39° 02' 26"	122° 24' 26"	369	26	7.8	≥300	About 50 m north of bridge
CL93-66	Blanc Hot Spring	12/05/93	Wilbur	37	Wilbur Springs	39° 01' 53"	122° 25' 53"	436	43	7.5	12	At pipe into tub
SC94-10	Blanc Hot Spring	05/22/94	Wilbur	37	Wilbur Springs	39° 01' 53"	122° 25' 53"	436	44	7.5	14	At pipe into tub
CLJ95-9	Blanc Hot Spring	12/20/95	Wilbur	37	Wilbur Springs	39° 01' 53"	122° 25' 53"	436	36	7.5	1	At pipe into tub
CL93-51	Elbow Hot Spring	09/30/93	Wilbur	12	Wilbur Springs	39° 02' 14"	122° 25' 31"	413	70	8.5	2	From source
CL93-65	Elbow Hot Spring	12/05/93	Wilbur	12	Wilbur Springs	39° 02' 14"	122° 25' 31"	413	72	8.2	≤1	From source
SC94-13	Elbow Hot Spring	05/23/94	Wilbur	12	Wilbur Springs	39° 02' 14"	122° 25' 31"	413	74	8.3	0.5	From source
CL95-10	Elbow Hot Spring	07/18/95	Wilbur	12	Wilbur Springs	39° 02' 14"	122° 25' 31"	413	70.5	8.2	0.5	From source
CLJ95-8	Elbow Hot Spring	12/19/95	Wilbur	12	Wilbur Springs	39° 02' 14"	122° 25' 31"	413	74	8.0	0.5	From source
CL96-3	Elbow Hot Spring	06/15/96	Wilbur	12	Wilbur Springs	39° 02' 14"	122° 25' 31"	413	73	8.1	0.5	From source
CL93-67	Elgin Hot Spring Main	12/06/93	Elgin Mine	38	Wilbur Springs	39° 03' 30"	122° 28' 27"	658	69	8.2	20	Main pool, S edge of pond
SC94-20	Elgin Hot Spring Main	05/24/94	Elgin Mine	38	Wilbur Springs	39° 03' 30"	122° 28' 27"	658	70	8.3	22.4	Main pool, S edge of pond
CL96-1	Elgin Hot Spring Main	06/15/96	Elgin Mine	38	Wilbur Springs	39° 03' 30"	122° 28' 27"	658	67	7.7	26	Main pool, S edge of pond
CL97-7	Elgin Hot Spring Main	06/20/97	Elgin Mine	38	Wilbur Springs	39° 03' 30"	122° 28' 27"	658	67.6	8.2	25	Main pool, S edge of pond
SC94-19	Elgin Hot Spring, Orange Bathtub	05/24/94	Elgin Mine	38	Wilbur Springs	39° 03' 42"	122° 28' 32"	652	63	8.2	41.6	Site 300 m E of main site
CL91-12	Jones Hot Spring	03/09/91	Wilbur	12	Wilbur Springs	39° 02' 02"	122° 25' 36"	416	61.9	8.0	0-10	Disappearing spring, by bricks
CL92-34	Jones Hot Spring	06/02/92	Wilbur	12	Wilbur Springs	39° 02' 02"	122° 25' 36"	416	57	8.2	20 at peak	Disappearing spring, by bricks
SC94-12	Jones Hot Spring	05/23/94	Wilbur	12	Wilbur Springs	39° 02' 02"	122° 25' 36"	416	58	8.0	0 to ≥ 95	Disappearing spring, by bricks
CL95-6	Jones Hot Spring	04/01/95	Wilbur	12	Wilbur Springs	39° 02' 02"	122° 25' 36"	416	56.2	8.0	nm	Disappearing spring, by bricks
CL95-Oct95	Jones Hot Spring	10/12/95	Wilbur	12	Wilbur Springs	39° 02' 02"	122° 25' 36"	416	55	8.0	nm	Disappearing spring, by bricks
CL96-5	Jones Hot Spring	06/16/96	Wilbur	12	Wilbur Springs	39° 02' 02"	122° 25' 36"	416	57	8.0	nm	Disappearing spring, by bricks
SC94-1	Sulphur Creek, 25 m downstream of fence	05/21/94	Wilbur	13	Wilbur Springs	39° 02' 09"	122° 25' 36"	412	27	8.0	356	Downstream of Jones/Elbow
SC94-3	Sulphur Creek, 20 m downstream of 94-2	05/21/94	Wilbur	13	Wilbur Springs	39° 02' 10"	122° 25' 35"	412	26	8.0	nm	Downstream of gassy area
SC94-6	Sulphur Creek, upstream of Wilbur terrace	05/22/94	Wilbur	13	Wilbur Springs	39° 02' 19"	122° 25' 20"	411	20	7.8	nm	Wide area in creek
SC94-7	Sulphur Creek, below bath house	05/22/94	Wilbur	13	Wilbur Springs	39° 02' 18"	122° 25' 10"	411	26	8.3	224	Narrow spot in creek
SC94-9	Sulphur Creek, 200 m above Bear Creek	05/22/94	Wilbur	13	Wilbur Springs	39° 02' 19"	122° 24' 27"	408	26.5	8.5	190	Narrow spot in creek

Table 1: Continued

Sample No.	Location	Date	Area^a	Map No.^a	USGS 7.5 Minute Quad	Latitude	Longitude	Elevation (m)	Temp (°C)^b	pH (field)^b	Flow (l/min)^b	Sampling Point; Comments
SC94-11	Sulphur Creek, scarp dnstrm W. End Mine	05/22/94	Wilbur	13	Wilbur Springs	39° 02' 02"	122° 26' 12"	414	31	8.5	127	Upstream of Jones/Elbow
SC94-25A	Sulphur Creek @ Elbow Spring	08/94	Wilbur	12	Wilbur Springs	39° 02' 07"	122° 25' 38"	413	26.3	nm	nm	Junction of features
94T16	Sulphur Creek upstream of Jones ^a	05/01/94	Wilbur	unknown	Wilbur Springs	unknown	unknown	unknown	cold	np	np	Sample from J. Rytuba, USGS
94T17	Sulphur Creek upstream of Jones ^a	05/01/94	Wilbur	unknown	Wilbur Springs	unknown	unknown	unknown	cold	np	np	Sample from J. Rytuba, USGS
94T18	Sulphur Creek upstream of Jones ^a	05/01/94	Wilbur	unknown	Wilbur Springs	unknown	unknown	unknown	cold	np	np	Sample from J. Rytuba, USGS
94T22	Sulphur Creek upstream of Jones ^a	05/01/94	Wilbur	unknown	Wilbur Springs	unknown	unknown	unknown	cold	np	np	Sample from J. Rytuba, USGS
SC94-18	Turkey Creek	05/24/94	Turkey Run	34	Wilbur Springs	39° 00' 57"	122° 26' 22"	512	26	8.3	39	About 50 m north of highway
CL93-47	Turkey Run Mine Spring	05/05/93	Turkey Run	34	Wilbur Springs	39° 01' 02"	122° 26' 22"	537	29	6.5	50	From source
SC94-16	Turkey Run Mine Spring	05/24/94	Turkey Run	34	Wilbur Springs	39° 01' 02"	122° 26' 22"	537	28	6.5	57	From source
CL95-5	Turkey Run Mine Spring	04/01/95	Turkey Run	34	Wilbur Springs	39° 01' 02"	122° 26' 22"	537	29	6.8	nm	From source
SC94-2	Unnamed Hot Spring, 50 m downstream 94-1	05/21/94	Wilbur	12	Wilbur Springs	39° 02' 09"	122° 25' 36"	412	52	7.0	≤ 0.5	From source, S edge of creek
CL93-52	Wilbur Spring, Don White's	09/30/93	Wilbur	13	Wilbur Springs	39° 02' 21"	122° 25' 14"	412	57	7.8	5	About 50 m E of main site
SC94-4	Wilbur Spring, Don White's	05/21/94	Wilbur	13	Wilbur Springs	39° 02' 21"	122° 25' 14"	412	58	7.2	nm	About 50 m E of main site
CLJ95-10	Wilbur Spring, Don White's	12/20/95	Wilbur	13	Wilbur Springs	39° 02' 21"	122° 25' 14"	412	54.5	8.0	nm	About 50 m E of main site
CL91-13	Wilbur Hot Spring, Main	03/09/91	Wilbur	13	Wilbur Springs	39° 02' 20"	122° 25' 18"	412	55.6	7.5	7?	Central pool in concrete crib
CL92-33	Wilbur Hot Spring, Main	06/02/92	Wilbur	13	Wilbur Springs	39° 02' 20"	122° 25' 18"	412	55.3	7.8	20	Central pool in concrete crib
SC94-5	Wilbur Hot Spring, Main	05/21/94	Wilbur	13	Wilbur Springs	39° 02' 20"	122° 25' 18"	412	57	7.0	nm	Central pool in concrete crib
CL95-9	Wilbur Hot Spring, Main	07/18/95	Wilbur	13	Wilbur Springs	39° 02' 20"	122° 25' 18"	412	56.3	7.5	nm	Central pool in concrete crib
CL96-4	Wilbur Hot Spring, Main	06/15/96	Wilbur	13	Wilbur Springs	39° 02' 20"	122° 25' 18"	412	56	7.3	nm	Central pool in concrete crib
CL93-53	Wilbur, spring between Main and road	09/30/93	Wilbur	13	Wilbur Springs	39° 02' 20"	122° 25' 18"	412	55	8.0	10	Concrete pool with pink algae

^aAreas and map numbers are referenced relative to Clear Lake on Figure 1; Oaks Arm = Oaks Arm of Clear Lake; BSFZ = Bartlett Springs fault zone and vicinity northeast of Clear Lake.^bna=not applicable; nm=not measured; np=not provided

Table 2: Analytical methods used for water samples listed in this report. Detection limits are in ppm or mol-% as indicated.

Water Analyses							Gas Analyses		
Analyte	Method	Detect Limit	Method	Detect Limit	Method	Detect Limit	Analyte	Method	Detect Limit
Ag	GFAA	0.0005	ICP-AES	0.002			Ar	GC	0.01%
Al (total)	GFAA	0.002	ICP-AES	0.02			As	Hydride AA	0.002 ppm
Al monomeric	GFAA	0.0001					C ₂ H ₆	GC	0.01%
As	Hydride-AA	0.0002	GFAA	0.002	ICP-AES	0.05	CH ₄	GC	0.01%
Au	GFAA	0.002	ICP-AES	0.02			CO	GC	0.01%
B	ICP-AES	0.002					CO ₂	GC	5 ppm
Ba	ICP-AES	0.002					H ₂	GC	0.01%
Balance	Calculated						H ₂ S	Ion Selective Electrode	0.01 ppm
Be	ICP-AES	0.002					HBr	IC	0.2 ppm
Br	IC	0.005					HCl	IC	1 ppm
Ca	ICP-AES	0.002					He	GC	0.01%
Cd	GFAA	0.0002	ICP-AES	0.005			HF	IC	0.1 ppm
Cl	IC	0.01					Hg	Cold Vapor AA	0.0002 ppm
CN	Electrode	0.02					N ₂	GC	0.01%
Co	GFAA	0.002	ICP-AES	0.01			NH ₃	Ion Selective Electrode	0.05 ppm
CO ₂ /HCO ₃ /OH	Titration	0.5					O ₂	GC	0.01%
Cond.(L)	Electrode	0.5					S(total as SO ₃)	IC	1 ppm
Cr	GFAA	0.002	ICP-AES	0.01			Sb	Hydride AA	0.0002 ppm
Cs	GFAA	0.002	AA	0.02			Se	Hydride AA	0.0002 ppm
Cu	GFAA	0.002	ICP-AES	0.01					
F	IC	0.01	Electrode	0.01					
Fe	ICP	0.01							
Fe (Dig)	ICP	0.01							
Hg	Cold Vapor AA	0.00002							
Hg raw	Cold Vapor AA	0.0001							
I	IC	0.01							
K	AA	0.01	ICP-AES	0.2					
Li	ICP-AES	0.005							
Mg	ICP-AES	0.002							
Mn	ICP-AES	0.002							
Mo	GFAA	0.002	ICP-AES	0.02					
Na	AA	0.01	ICP-AES	0.05					
NH ₄	Electrode	0.02							
Ni	GFAA	0.002	ICP-AES	0.01					
NO ₂	IC	0.01							
NO ₃	IC	0.01							
Pb	GFAA	0.002	ICP-AES	0.05					
pH (L)	Electrode	0.01							
PO ₄	IC	0.02							
Rb	GFAA	0.002	AA	0.01					
S	Electrode	0.01							
Sb	Hydride AA	0.0002	GFAA	0.002	ICP-AES	0.05			
Se	Hydride AA	0.0002	GFAA	0.002	ICP-AES	0.1			
Si	ICP-AES	0.02							
Sn	GFAA	0.005							
SO ₄	IC	0.02							
SO ₃	IC	0.02							
S ₂ O ₃	IC	0.01							
Sr	ICP-AES	0.005							
TDS	Calculated								
Ti	ICP-AES	0.002							
Tl	GFAA	0.002							
TOC	TOC analyzer	0.1							
V	ICP-AES	0.002							
Zn	ICP-AES	0.005							

Table 3: Major element chemical analyses of thermal and nonthermal waters in The Geysers-Clear Lake region, California (temperatures in °C, conductivities in micromhos/cm² and concentrations in ppm; L = Lab).

Sample No.	Location	Date	Temp.	pH (L)	Cond.(L)	SiO ₂	Ca	Mg	Sr	Na	K	Li	HCO ₃	CO ₃	SO ₄	Cl	F	Br	B	TDS
The Geysers - Clear Lake Region, General Locations																				
CL93-45	Adams Spring	05/04/93	15	6.87	4100	94	171	402	2.9	298	6.86	0.51	3330	0	115	28	0.27	0.11	1.53	4460
CL91-27	Adrienne's Well	03/13/91	11.2	7.84	417	18.8	30.7	22	0.32	18.1	2.7	0.02	221	0	11.5	14.3	0.15	<0.02	1.44	343
CL91-8	Ag. Park Well #3	03/08/91	65.7	7.25	1200	189	23.4	16	0.31	148	35.5	1.09	386	0	25.2	153	0.15	0.84	29.8	1025
CL92-37	Allen Spring	06/03/92	17	7.96	3830	96.5	152	420	1.89	297	8.37	2.37	1840	422	2.09	470	<0.05	1.64	45.9	3790
CL91-5	Baker Soda Spring	03/07/91	21.3	7.34	14500	87.7	92.6	279	2	2600	207	6.25	4650	0	0.25	2985	0.52	11.1	171	11250
CL92-29	Baker Soda Spring	06/02/92	23.6	7.86	13650	89.5	97.5	294	1.71	2730	212	5.79	3695	311	0.38	3110	0.4	11.5	150	11250
CL96-6	Baker Soda Spring (anions only)	06/17/96	22.2	---	---	---	---	---	---	---	---	---	4445	0	<0.5	2690	0.6	11.5	159	---
CL91-14	Barrel Spring	03/09/91	10.8	8.00	831	49.6	11.8	83.8	0.1	7.8	<0.1	<0.01	370	60.0	4.1	9.5	0.03	<0.02	<0.02	597
SBM95-8	Big Mother Spring in Clear Lake	09/13/95	22.0	10.31	226	0.1	20.6	4.27	0.21	11.7	2.20	0.01	0	43.2	6.49	5.82	0.10	<0.02	0.76	99
CL91-2	Big Soda Spring	03/06/91	31.3	6.68	1695	133	79.8	110	0.58	95.0	11.5	0.45	1040	0	0.2	56.8	0.32	0.27	12.3	1560
CL92-42	Big Soda Spring	06/04/92	31	7.98	1545	140	82.6	108	0.58	102	9.0	0.51	870	63.7	0.24	59.5	0.2	0.27	13.4	1475
CL93-70	Borax Lake	12/07/93	10	9.68	29700	0.3	8.37	81.2	0.40	7860	351	1.79	725	3770	22.9	7695	0.89	31.8	332	20890
CL91-17	Chalk Mt. Spring	03/09/91	16.1	7.04	15720	99.5	89.7	588	4.1	2290	242	9.35	4900	0	175	3385	0.64	11.7	288	12280
CL92-31	Chalk Mt. Spring	06/02/92	21	7.78	14800	108	99.1	643	3.48	2290	261	8.58	3915	387	162	3510	0.4	12.3	284	12290
CL91-25	Clear Lake, Konocti Bay	03/13/91	10.2	7.93	409	18.6	30.1	22.1	0.33	17.9	2.0	0.02	234	0	7.7	9.4	0.15	<0.02	1.46	346
CL93-69	Clear Lake, city of Clearlake	12/07/93	12	7.94	409	5.9	30.1	21.9	0.37	18.0	2.5	0.03	223	0	7.22	18.3	0.13	0.06	1.44	329
SBM97-5	Clear Lake, Clearlake Highlands	11/16/97	13.3	7.88	270	1.4	21.9	15.6	0.21	11.6	2.01	0.02	157	0	4.73	5.62	0.09	<0.02	0.97	221
CL91-3	Cold Spring near Cross Spring	03/07/91	9	7.84	397	45.8	23.1	20.6	0.19	26.0	3.9	0.03	211	0	10	13.6	0.17	<0.02	0.33	356
CL91-15	Complexion Spring	03/09/91	8.9	10.82	47900	15.0	3.7	22.9	0.5	11845	335	<0.1	0	220	48.5	17260	0.14	56.2	17	30240
CL92-36	Complexion Spring	06/03/92	19.1	11.81	53400	33.6	0.1	<0.02	0.48	13400	397	0.9	0	148	55.9	20860	0.27	69.3	24.6	35625
CL96-2	Complexion Spring (anions only)	06/15/96	15.0	---	---	---	---	---	---	---	---	---	0	233	41.5	16230	0.22	55.9	19.7	---
CLH96-4	Coppage Spring	08/22/96	19	7.57	3410	67.8	215	303	3.31	235	5.16	0.04	2785	0	0.09	38.5	0.2	0.2	1.63	3670
CL92-40	Crabtree Hot Spring	06/03/92	42	8.16	8570	186	57.7	213	1.12	1835	34	4.94	3270	396	18.3	1270	<0.05	3.79	328	7660
CLH96-3	Duncan Soda Spring	08/21/96	16	7.43	3270	91.6	103	507	1.14	25.5	1.01	0.03	2820	0	0.29	20.2	0.19	0.06	2.92	3580
CL91-9	Ettawa Spring	03/08/91	21.7	6.95	3750	104	31.6	228	1.25	572	10.4	0.61	2570	0	0.3	183	<0.02	1.01	21	3735
CL91-24	Gas Spring	03/12/91	10.0	5.62	624	18.6	55	29.1	0.41	9.6	0.8	0.01	118	0	205	3	0.26	<0.02	0.1	451
CL91-20	Gordon Cold Spring	03/11/91	9.0	7.27	53	38.1	4.5	1.89	0.07	4.2	1.5	<0.01	43.9	0	0.5	1.1	0.02	<0.02	<0.03	96
CL92-43	Gordon Cold Spring	06/04/92	15.5	7.36	57	43.4	4.4	1.6	0.01	5.02	2.7	<0.01	31.0	0	0.47	1.28	0.02	<0.02	<0.05	90
CL91-21	Gordon Warm Spring	03/11/91	34.6	7.54	584	171	10.8	31.5	0.3	56.0	3.9	0.15	282	0	0.4	45.4	<0.02	0.18	1.04	605
CL91-16	Grizzly Spring	03/09/91	19.4	7.05	15920	89.9	52.3	686	13	2685	45	3.8	4845	0	12.2	3750	0.4	16.1	167	12400
CL92-32	Grizzly Spring	06/02/92	20.9	7.99	15160	116	55.5	808	11.3	2750	56	4.13	3950	325	8.17	3930	0.19	12.9	165	12345
CL91-4	Hog Hollow Spring	03/07/91	30.0	6.59	1905	149	105	47.2	0.9	196	11.8	0.51	809	0	0.2	169	0.3	0.64	14.8	1520
CL92-35	Hog Hollow Spring	06/02/92	29.1	7.87	1810	132	109	46.5	0.89	213	14.5	0.55	752	59	9.91	193	0.23	0.67	16.8	1560
CL93-50	Hough Spring	05/06/93	14	6.40	2280	74	428	41.2	4.47	72.1	6.35	0.20	1785	0	1.59	2.58	1.16	<0.02	2.35	2355
CL91-26	Howard Spring	03/13/91	46.3	7.13	3430	156	31.6	297	1.0	254	21.7	1.3	1680	0	0.1	457	<0.02	2.35	37.4	2955
CL91-11	Joe's Spring	03/08/91	13.6	7.17	180	73.2	13.3	9.52	0.24	8.4	3.4	<0.01	116	0	0.6	3.4	0.05	<0.02	<0.02	228
CL93-72	Little Borax Lake	12/07/93	11	8.82	2350	7.6	9.18	134	0.43	358	131	0.16	1230	220	19.8	53.3	0.42	0.2	48.1	2220
SBM95-9	Little Soda Spring	09/13/95	32.0	8.63	1145	131	8.40	110	0.21	105	12.2	0.50	556	87.9	0.21	62.5	0.29	0.29	13.0	1110
CLH96-6	Lucchetti "Bad Water" Well	08/22/96	19.5	7.09	1895	52.9	231	69.6	5.88	143	4.07	0.11	1415	0	8.81	6.73	0.34	0.04	1.41	1965
CL92-30	Mayfield Well	06/02/92	17.3	8.02	1730	91.0	74.4	199	0.34	47.6	8.6	0.09	845	56	295	5.97	0.1	<0.02	1.34	1630
CL91-18	New Ciardella Well	03/11/91	10.7	7.08	268	68.1	12.1	11.3	0.15	19.9	6.7	<0.01	149	0	9.2	2.6	0.24	<0.02	0.285	
CL93-49	New Ciardella Well	05/05/93	15	6.99	104	74.7	6.06	3.84	0.05	6.4	4.72	0.02	58.5	0	0.6	1.83	0.13	<0.05	0.13	158
CL91-23	Newman Spring I	03/12/91	29.0	7.25	14210	179	154	529	3.7	2340	54.3	22.6	4320	0	34.9	3180	0.37	11.8	366	11290
CL92-38	Newman Spring II	06/03/92	29	7.81	8300	138	128	551	2.18	1190	26	10.2	2830	402	11.5	1615	<0.05	5.66	187	7265
CL92-41	Pinnacle Rock Spring	06/03/92	13	8.42	206	15.0	30.8	7.92	0.52	6.15	0.52	0.12	105	7.9	11	1.08	0.06	<0.02	0.2	187
CLH96-1	Reeve's 2 Well	08/21/96	18.5	7.90	673	57.4	22	84.8	0.14	6.49	0.21	<0.01	427	0	30	6.1	0.15	0.02	0.11	636
CL91-10	Spiers Spring	03/08/91	24.2	6.82	4030	151	27.8	310	0.85	391	15.8	1.26	2095	0	6.3	448	<0.02	2.56	91	3580
CL91-22	Sulphur Creek Spring	03/11/91	21	6.61	1990	141	20.8	156	0.5	165	14.8	0.98	901	0	46.5	255	0.05	1.16	15.6	1735
CLH96-2	Tribal 1 Well	08/21/96	18.5	7.54	854	57.6	76.4	42.5	0.83	53.2	1.45	<0.01	585	0	0.04	7.6	0.25	0.06	0.12	842
CLH96-5	Vintage Well	08/22/96	21	7.98	759	23.3	56.7	24.2	0.68	85.2	1.02	<0.01	483	0	6.97	18.5	0.36	0.12	0.36	703
Anderson Springs Area																				
CL91-19	Anderson Hot Spring	03/11/91	49.4	6.42	1530	84.7	157	52.4	1.19	39.0	9.5	0.18	203	0	619	2.1	0.35	<0.02	0.02	1215
CL92-44	Anderson Hot Spring	06/04/92	48.0	7.73	968	63.8	87.8	35.2	0.67	34.2	7.42	0.20	186	0	331	3.09	0.38	<0.02	0.87	788
CL98-3	Anderson Hot Spring	09/10/98	68.0	7.13	920	73.2	75.8	32.2	0.69	52.6	8.02	0.28	332	0	228	1.98	0.33	0.01	0.45	832
CL98-5	Anderson Hot Spring	12/04/98	50.4	6.94	654	51.4	52.0	23.0	0.42	33.4	5.31	0.16	224	0	150	2.76	0.28	0.08	0.33	560

Table 3: Continued

Sample No.	Location	Date	Temp.	pH (L)	Cond.(L)	SiO₂	Ca	Mg	Sr	Na	K	Li	HCO₃	CO₃	SO₄	Cl	F	Br	B	TDS
And99-2	Anderson Hot Spring	08/19/99	69.5	7.13	920	74.9	72.3	28.5	0.58	51.0	9.17	0.25	348	0	206	1.97	0.38	<0.02	0.52	822
CL98-2	Anderson, New Hot Spring	09/10/98	90.4	7.58	558	66.1	29.9	11.1	0.26	35.9	4.46	0.04	101	0	165	1.77	0.29	0.03	0.43	450
And99-4	Anderson, New Hot Spring	08/20/99	98.4	8.36	492	75.1	17.1	3.93	0.12	37.8	4.70	0.05	3.8	16.6	179	1.49	0.02	0.08	0.52	369
No number	Anderson, New Hot Spring	09/16/99	99.5	7.79	668	82.2	23.1	8.40	0.12	47.2	5.02	0.02	21.0	0	264	1.58	0.35	<0.02	0.53	500
And99-5	Creek, below hot springs at adit	08/20/99	20.5	5.90	530	41.1	39.9	24.6	0.32	14.4	4.76	0.03	0.8	0	261	2.40	7.12	0.03	0.21	405
And99-3	Fe-rich Spring	08/19/99	21.1	6.27	851	38.5	82.7	51.2	0.48	18.2	1.25	0.05	31.8	0	445	2.11	1.41	<0.02	0.05	677
CL98-4	Schwartz Mine Adit	12/04/98	22.0	6.15	1010	68.5	108	54.3	0.12	11.4	6.74	0.15	62.0	0	508	1.89	0.75	<0.02	0.088	850
And99-6	Schwartz Mine Adit	08/20/99	18.8	6.67	1160	68.5	128	60.3	0.54	13.4	9.04	0.18	175	0	520	1.63	6.51	<0.02	0.10	1010
AND99-8	Schwartz Mine Adit	10/05/99	24.1	7.00	1310	67.6	145	69.9	0.67	16.9	10.8	0.22	336	0	496	1.60	0.45	<0.02	0.11	1175
And99-7	Schwartz drainage, just above road	08/20/99	12.4	6.54	848	43.7	92.4	44.7	0.41	12.8	6.89	0.13	7.4	0	443	1.69	0.02	<0.02	0.16	686
<i>Sulphur Bank Mine Area</i>																				
SBM95-6	Basalt (North) Pit	09/12/95	25.0	2.35	4730	182	181	62.5	0.76	58.1	1.12	0.19	0	0	4700	6.73	2.22	<0.1	6.63	5765
SB99-2	Basalt (North) Pit	08/17/99	22.1	2.65	4640	168	281	85.5	1.02	75.1	1.79	0.26	0	0	5620	1.27	1.13	<0.05	10.2	7120
SB99-1	Basalt (North) Pit Spring	08/17/99	25.7	3.41	5440	116	380	135	1.33	87.6	10.1	0.26	0	0	5670	1.98	1.62	<0.05	18.8	7710
SB99-15	Clear Lake, Middle Rip Rap	08/18/99	26.2	7.88	247	9.1	20.1	13.7	0.20	10.0	1.97	0.02	135	0	12.2	4.57	0.10	0.02	0.93	209
SBM97-3	Clear Lake, N. Rip Rap	11/11/97	15.9	7.78	275	3.4	22.5	15.9	0.22	11.8	2.07	0.02	155	0	8.12	5.70	0.11	<0.02	1.03	229
SB99-13	Clear Lake, N. Rip Rap	08/18/99	24.8	8.01	257	10.0	21.0	14.0	0.20	11.1	2.08	0.05	131	0	18.7	5.56	0.09	0.03	1.45	216
SBM95-4	Clear Lake, S. Rip Rap	09/12/95	25.1	8.25	274	10.4	21.3	16.2	0.22	11.9	2.15	0.02	155	0	10.1	6.40	0.11	<0.02	1.09	236
SBM97-4	Clear Lake, S. Rip Rap	11/11/97	15.6	7.66	330	4.3	23.3	16.5	0.23	16.4	2.15	0.04	145	0	35.4	8.42	0.12	<0.02	3.70	265
SB99-16	Clear Lake, S. Rip Rap	08/18/99	26.2	7.52	270	9.5	20.9	14.0	0.20	11.6	2.07	0.02	127	0	25.7	6.05	0.08	0.03	1.90	222
SBM95-7a	Frog Pond (Green Bubbling Pool)	09/12/95	25.6	5.82	153	29.1	8.99	6.75	0.077	9.91	2.53	<0.01	48.5	0	23.8	4.81	0.06	<0.02	0.087	135
SB99-17	Green Pond	08/19/99	24.9	3.06	778	30.0	20.2	16.3	0.14	14.2	6.08	0.02	0	0	301	4.73	0.13	0.03	0.36	413
CL93-54	Herman Pit, east end	09/30/93	23.5	3.09	6680	75.1	201	186	2	699	25.3	2.83	0	0	3345	335	1.65	2.6	336	5635
CL93-56	Herman Pit, east end	12/04/93	14	3.13	6730	75.1	200	179	2.41	649	24.6	2.68	0	0	3385	350	1.77	2.64	333	5695
SBM95-1	Herman Pit, east end	09/11/95	23.4	2.88	5950	71.7	173	145	1.60	541	20.5	2.24	0	0	3455	333	1.16	2.12	278	5287
SBM97-1	Herman Pit, east end	11/11/97	17.2	3.06	5510	71.7	157	129	1.51	482	19.9	2.23	0	0	2730	324	1.19	2.28	279	4552
SB99-11	Herman Pit, east end	08/17/99	24.8	3.04	4990	67.4	144	116	1.27	432	18.3	1.85	0	0	3275	284	1.02	2.04	257	4910
SB99-10	Herman Pit, site 4	08/17/99	24.8	3.03	4960	67.0	143	116	1.26	434	18.0	1.82	0	0	3220	280	1.04	2.17	257	4853
SBMM00-6	Herman Pit, site 4	12/03/00	13.1	3.14	5240	70.8	153	121	1.36	487	20.4	2.02	0	0	3020	314	0.77	2.33	314	4883
CL93-63	Herman Pit, west end	12/04/93	14	3.11	6790	71.9	203	179	2.38	648	24.8	2.73	0	0	3410	355	1.85	2.82	329	5732
SBM95-5	Herman Pit, west end	09/12/95	26.0	2.85	5850	71.5	174	144	1.59	543	19.9	2.27	0	0	3575	337	1.14	2.49	282	5555
SBM97-2	Herman Pit, west end	11/11/97	17.6	3.02	5410	73.2	158	130	1.44	466	19.7	2.30	0	0	2650	318	1.17	2.11	286	4455
SB99-9	Herman Pit, west end	08/17/99	24.8	3.04	4990	68.5	146	119	1.27	434	18.1	1.83	0	0	3125	283	1.03	2.13	256	4770
SB99-12	Rip-Rap Seep	08/18/99	22.8	4.55	1085	23.5	47.8	32.6	0.39	75.8	3.22	0.28	<0.8	0	530	51.6	0.24	0.38	36.2	840
SBM95-3	Well CL #1, leaking geothermal fluid	09/11/95	27.0	8.56	7010	96.7	208	44.0	16.5	1240	48.1	4.98	0	1645	278	858	0.50	7.79	747	5763
SBMM00-5	Well CL #1, leaking geothermal fluid	12/01/00	13.6	7.49	7960	121	295	47.5	24.3	998	36.4	5.09	2520	0	12.7	747	0.62	5.26	699	7603
<i>Sulphur Creek Mining District</i>																				
SC94-14	Bear Creek, upstrm of Sulphur Creek	05/23/94	26	8.57	1270	26.3	20.7	110	0.70	94	5.8	0.26	484	37.4	16.9	162	0.06	0.48	2.86	962
SC94-15	Bear Creek, dwstrm of Sulphur Creek	05/23/94	26	8.41	2550	27.4	23.6	113	0.78	370	16.9	0.56	608	49.3	28.9	475	0.11	1.41	10.8	1738
CL93-66	Blanck Hot Spring	12/05/93	43	8.02	31800	116	2.76	65.9	1.00	7570	439	8.78	5850	500	292	8510	3.58	23.4	196	24003
SC94-10	Blanck Hot Spring	05/22/94	44	8.03	32200	127	3.4	67.2	1.15	7670	417	8.6	5970	515	333	8765	2.65	23.1	191	24546
CLJ95-9	Blanck Hot Spring	12/20/95	36	8.15	28400	117	3.89	63.5	0.97	6640	331	7.99	3925	332	506	7550	2.47	23.7	165	19919
CL93-51	Elbow Hot Spring	09/30/93	70	8.27	44100	52.2	1.1	4.75	1.65	10500	483	13.8	6985	1060	342	12840	5.01	34	355	33024
CL93-65	Elbow Hot Spring	12/05/93	72	8.21	43900	68.1	1.06	4.54	1.63	10840	589	15.4	7030	1025	182	12530	5.76	34.5	331	33145
SC94-13	Elbow Hot Spring	05/23/94	74	8.16	44700	80.3	1.9	5.60	1.82	10800	504	14.7	7620	984	455	13390	4.91	34.4	337	34780
CLJ95-8	Elbow Hot Spring	12/19/95	74	8.43	43300	72.1	1.9	5.09	1.92	10400	512	15.5	6160	1216	350	13000	4.36	40.2	315	32480
CL96-3	Elbow Hot Spring (anions only)	06/15/96	73	---	---	---	---	---	---	---	---	---	7465	725	56.5	13170	4.48	35.6	318	---
CL93-67	Elgin Hot Spring Main	12/06/93	69	8.04	39100	148	4.90	28.7	1.34	9465	568	12.0	6285	581	221	11170	3.48	31.3	223	29250
SC94-20	Elgin Hot Spring Main	05/24/94	70	8.03	39000	157	4.7	28.6	1.47	9190	520	11.3	6235	593	200	11390	2.55	30.9	223	29420
CL96-1	Elgin Hot Spring Main (anions only)	06/15/96	67	---	---	---	---	---	---	---	---	---	6540	368	104	10770	2.43	35.3	196	---
SC94-19	Elgin Hot Spring, Orange Bathtub	05/24/94	63	8.12	39400	120	3.2	15.6	1.28	9230	516	11.1	5960	645	262	11480	2.56	30.8	223	29310
CL91-12	Jones Hot Spring	03/09/91	61.9	7.88	41000	88.8	5.6	41.0	1.10	9740	513	14.0	8250	0	170	11210	5.15	32.1	300	30620
CL92-34	Jones Hot Spring	06/02/92	57	8.26	33200	80.5	4.3	38.7	1.27	10300	470	13.2	6485	740	209	11690	4.24	34.2	328	30730
SC94-12	Jones Hot Spring	05/23/94	58	8.02	39000	86.2	4.5	44.1	1.16	9450	445	12.9	6365	634	203	11260	3.62	29.9	284	29280
CL95-6	Jones Hot Spring	04/01/95	56.2	8.06	38000	86.5	5.06	64.6	1.14	8580	459	13.7	6255	572	152	10920	3.79	31.6	265	27900

Table 3: Continued

Sample No.	Location	Date	Temp.	pH (L)	Cond.(L)	SiO ₂	Ca	Mg	Sr	Na	K	Li	HCO ₃	CO ₃	SO ₄	Cl	F	Br	B	TDS	
CL95-Oct95	Jones Hot Spring	10/12/95	55	8.77	37900	91.4	3.80	41.7	1.12	9705	493	14.1	3265	1830	220	11860	2.54	32.4	302	28130	
CL96-5	Jones Hot Spring (anions only)	06/16/96	57	---	---	---	---	---	---	---	5870	463	109	9130	3.45	32.2	234	---	---		
SC94-1	Sulphur Creek	05/21/94	27	8.12	18240	21.8	42.3	143	1.72	4000	183	4.86	2470	170	183	4990	1.34	13.4	117	12710	
SC94-3	Sulphur Creek	05/21/94	26	8.08	18790	20.1	36.5	144	1.74	3985	186	5.20	2570	195	193	5030	1.34	14.1	123	12940	
SC94-6	Sulphur Creek	05/22/94	20	8.13	20100	30.4	40.9	137	1.74	4550	205	5.50	2895	245	185	5480	1.26	14.5	133	14310	
SC94-7	Sulphur Creek	05/22/94	26	8.23	24800	65.9	27.3	124	1.89	5640	264	8.40	3565	342	211	6770	1.54	18	161	17770	
SC94-9	Sulphur Creek	05/22/94	26.5	8.54	23100	50.9	29.2	130	1.88	5080	238	6.49	2840	469	209	6350	1.55	17.1	145	15930	
SC94-11	Sulphur Creek	05/22/94	31	8.64	11360	5.2	43.1	173	1.47	2290	87.6	2.52	1105	194	129	3150	0.3	8.66	60.6	7270	
SC94-25A	Sulphur Creek @ Elbow Spring	08/94	26.3	7.98	36700	59.7	21.6	79.5	1.40	9110	409	10.4	5695	480	263	11030	4.11	29.2	244	28050	
94T16	Sulphur Creek upstream of Jones	May-94	cold	7.93	11860	16.9	33.4	165	1.82	2490	110	2.68	1200	215	146	3195	0.42	8.95	65.2	7675	
94T17	Sulphur Creek upstream of Jones	May-94	cold	8.77	13950	20.5	28.3	138	1.57	2960	158	3.53	1480	290	157	3765	0.63	10.9	77.3	9135	
94T18	Sulphur Creek upstream of Jones	May-94	cold	8.94	16840	46.7	25.1	107	1.68	3700	211	4.59	1790	454	184	4605	0.94	13	97.5	11370	
94T22	Sulphur Creek upstream of Jones	May-94	cold	8.92	35100	85.2	17.2	54.5	1.38	8930	466	10.1	3480	1100	400	10130	2.24	28.3	204	25440	
SC94-18	Turkey Creek	05/24/94	26	8.60	8350	63.8	61.3	734	3.11	1035	33.7	1.82	1860	258	2010	1035	0.19	2.92	28	7165	
CL93-47	Turkey Run Mine Spring	05/05/93	29	7.32	9350	82.8	62.2	936	3.00	932	29.8	1.93	2330	0	2550	1110	0.2	3.26	39.6	8110	
SC94-16	Turkey Run Mine Spring	05/24/94	28	7.66	8600	74.9	54.8	753	3.01	1080	33.4	1.86	2245	148	1930	1020	0.17	2.51	33.6	7420	
CL95-5	Turkey Run Mine Spring	04/01/95	29	7.47	11050	74.0	120	1370	4.63	1070	40.2	2.17	1715	0	5310	1145	0.39	3.49	37.1	10970	
SC94-2	Unnamed Hot Spring	05/21/94	52	8.22	41800	54.1	6.1	5.60	0.99	10300	467	13.9	7455	664	194	12550	4.61	31.1	319	33010	
CL93-52	Wilbur Spring, Don White's site	09/30/93	57	7.93	37800	159	11.4	60	1.81	9000	401	10.2	6135	593	141	11080	2.66	30.3	285	28290	
SC94-4	Wilbur Spring, Don White's site	05/21/94	58	7.97	36500	198	5.1	49.9	2.01	8270	434	11.7	6100	608	258	10020	2.36	28.2	278	27070	
CLJ95-10	Wilbur Spring, Don White's site	12/20/95	54.5	8.44	34000	186	4.54	44.6	1.68	7990	390	11.3	4690	891	420	9720	2.11	30.2	255	24943	
CL91-13	Wilbur Hot Spring, Main	03/09/91	55.6	7.68	39300	199	5.6	54.8	2.00	8580	460	12.1	7375	0	157	10710	3.32	30.1	285	28160	
CL92-33	Wilbur Hot Spring, Main	06/02/92	55.3	8.25	31900	220	4.9	51.3	2.36	10100	459	12.6	6030	715	72.7	11100	2.82	32.8	295	29520	
SC94-5	Wilbur Hot Spring, Main	05/21/94	57	8.02	36800	201	4.3	49.9	1.99	8810	450	12.3	6440	608	187	10910	2.10	28.4	283	28880	
CL96-4	Wilbur Hot Spring, Main (anions only)	06/15/96	56	---	---	---	---	---	---	---	---	---	---	6090	270	98.5	8810	2.27	26.3	228	---
CL93-53	Wilbur, spring between main and rd	09/30/93	55	7.85	37800	186	4.8	58.0	1.82	9070	403	10.3	6095	571	14.8	10890	2.63	29.3	280	28150	

Table 4: Trace element chemical analyses of thermal and nonthermal waters in The Geysers-Clear Lake region, California (all analytical values in ppm).

Sample No.	Location	Date	Ag	Al, total ^a	Al, monomeric ^b	As	Au ^c	Be	Ba	Cd	CN	Co	Cr	Cs	Cu	Fe	Fe, raw, dig ^d	Hg	Hg, raw ^e
The Geysers - Clear Lake Region, General Locations																			
CL93-45	Adams Spring	05/04/93	<0.001	<0.1	---	<0.05	---	---	0.7	<0.001	---	<0.002	0.002	<0.002	0.004	0.40	---	---	---
CL91-27	Adrienne's Water	03/13/91	<0.001	<0.1	---	<0.05	---	---	0.04	<0.001	---	<0.002	<0.002	0.23	<0.01	---	<0.1	---	
CL91-8	Ag. Park Well #3	03/08/91	<0.001	<0.1	0.19	<0.05	---	---	0.22	<0.001	---	<0.002	<0.002	0.065	<0.002	0.10	---	<0.1	---
CL92-37	Allen Spring	06/03/92	<0.002	<0.2	---	0.5	---	---	1	<0.002	---	<0.002	<0.002	0.038	0.002	13.1	---	---	---
CL91-5	Baker Soda Spring	03/07/91	<0.001	<0.5	0.027	0.7	---	---	1.68	<0.002	---	<0.002	<0.002	0.13	<0.002	<0.05	---	<0.5	---
CL92-29	Baker Soda Spring	06/02/92	<0.002	<0.1	---	<0.1	---	---	1.69	<0.002	---	<0.002	<0.002	0.21	0.015	0.18	---	---	---
CL96-6	Baker Soda Spring (anions only)	06/17/96	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CL91-14	Barrel Spring	03/09/91	<0.001	<0.1	---	<0.05	---	---	0.11	<0.001	---	<0.002	0.010	<0.002	<0.002	0.03	---	<0.1	---
SBM95-8	Big Mother Spring in Clear Lake	09/13/95	<0.001	<0.02	---	0.0015	---	<0.002	0.046	<0.001	---	<0.002	<0.002	<0.002	<0.002	<0.01	---	<0.00005	<0.00005
CL91-2	Big Soda Spring	03/06/91	<0.001	<0.2	0.026	<0.1	---	---	0.47	<0.001	---	<0.002	<0.002	0.006	0.003	17.8	---	<0.2	---
CL92-42	Big Soda Spring	06/04/92	<0.002	<0.1	---	<0.05	---	---	0.45	<0.002	---	<0.002	<0.002	0.004	<0.002	17.9	---	---	---
CL93-70	Borax Lake	12/07/93	<0.01	0.15	---	0.004	---	---	0.062	<0.01	---	0.06	<0.01	<0.02	0.02	0.05	---	<0.0005	---
CL91-17	Chalk Mt. Spring	03/09/91	<0.002	<0.5	---	0.9	---	---	0.36	<0.002	---	<0.004	<0.004	0.13	<0.004	0.09	---	<0.5	---
CL92-31	Chalk Mt. Spring	06/02/92	<0.002	<0.1	---	<0.1	---	---	0.44	<0.002	---	<0.002	<0.002	0.15	<0.002	<0.01	---	---	---
CL91-25	Clear Lake, Konocti Bay	03/13/91	<0.001	<0.1	---	0.6	---	---	0.09	<0.001	---	<0.002	<0.002	<0.002	<0.002	0.01	---	<0.1	---
CL93-69	Clear Lake, city of Clearlake	12/07/93	<0.0005	0.07	---	0.003	---	---	0.09	<0.0005	---	<0.002	<0.002	0.002	0.028	0.02	---	<0.0005	---
SBM97-5	Clear Lake, Clearlake Highlands	11/16/97	<0.001	0.05	---	<0.001	---	<0.002	0.061	<0.001	---	<0.002	<0.002	0.002	<0.01	---	<0.0001	<0.0001	
CL91-3	Cold Spring near Cross Spring	03/07/91	<0.001	<0.1	---	<0.05	---	---	0.06	<0.001	---	0.002	<0.002	0.005	0.01	---	<0.1	---	
CL91-15	Complexion Spring	03/09/91	<0.002	<1	0.016	<0.5	---	---	0.1	<0.002	---	<0.004	<0.004	0.08	<0.004	<0.1	---	<1	---
CL92-36	Complexion Spring	06/03/92	<0.002	<0.2	---	<0.1	---	---	0.03	<0.002	---	<0.002	<0.002	0.07	<0.002	<0.1	---	---	---
CL96-2	Complexion Spring (anions only)	06/15/96	---	---	---	0.03	---	---	4.3	<0.001	---	<0.002	<0.002	0.007	0.012	0.13	---	<0.0002	---
CLH96-4	Coppage Spring	08/22/96	<0.0002	0.31	---	0.03	---	---	1.21	<0.002	---	<0.002	<0.002	0.036	<0.002	0.42	---	---	---
CL92-40	Crabtree Hot Spring	06/03/92	<0.002	<0.5	---	0.95	---	---	0.91	<0.001	---	<0.002	<0.002	0.006	0.012	4.26	---	<0.0002	---
CLH96-3	Duncan Soda Spring	08/21/96	<0.0002	0.24	---	<0.0002	---	---	1.96	<0.001	---	<0.002	<0.002	0.003	<0.002	0.88	---	<0.2	---
CL91-9	Ettawa Spring	03/08/91	<0.001	<0.2	---	<0.1	---	---	0.05	<0.001	---	0.026	0.007	0.003	0.003	8.48	---	<0.1	---
CL91-24	Gas Spring	03/12/91	<0.001	0.5	---	<0.05	---	---	0.02	<0.001	---	<0.002	0.002	<0.002	<0.002	0.03	---	<0.1	---
CL91-20	Gordon Cold Spring	03/11/91	<0.001	<0.1	---	<0.05	---	---	<0.01	<0.002	---	<0.002	<0.002	<0.002	<0.002	<0.01	---	---	---
CL92-43	Gordon Cold Spring	06/04/92	<0.002	<0.1	---	<0.05	---	---	4.51	<0.001	---	<0.002	<0.002	<0.002	<0.002	0.63	---	---	---
CL91-21	Gordon Warm Spring	03/11/91	<0.001	<0.1	---	<0.05	---	---	0.11	<0.001	---	<0.002	0.002	<0.002	<0.002	0.12	---	<0.1	---
CL91-16	Grizzly Spring	03/09/91	<0.002	<0.5	---	0.9	---	---	8.38	<0.002	---	<0.004	<0.004	0.026	<0.004	<0.05	---	<0.5	---
CL92-32	Grizzly Spring	06/02/92	0.012	<0.5	---	0.4	---	---	7.22	<0.002	---	<0.002	<0.002	0.018	0.005	0.22	---	---	---
CL91-4	Hog Hollow Spring	03/07/91	<0.001	<0.2	---	<0.1	---	---	1.05	<0.001	---	<0.002	<0.002	0.023	0.002	4.06	---	<0.2	---
CL92-35	Hog Hollow Spring	06/02/92	<0.002	<0.1	---	<0.05	---	---	0.95	<0.002	---	<0.002	<0.002	0.030	<0.002	<0.01	---	---	---
CL93-50	Hough Spring	05/06/93	<0.001	<0.1	---	<0.05	---	---	4.51	<0.001	---	<0.002	<0.002	<0.002	<0.002	0.63	---	---	---
CL91-26	Howard Spring	03/13/91	<0.001	<0.2	0.008	<0.1	---	---	1.04	<0.001	---	<0.002	<0.002	0.017	<0.002	0.12	---	<0.2	---
CL91-11	Joe's Spring	03/08/91	<0.001	<0.1	---	<0.05	---	---	0.03	<0.001	---	<0.002	<0.002	<0.002	<0.002	0.09	---	0.0009	---
SBM95-9	Little Soda Spring	09/13/95	<0.001	<0.02	---	0.0011	---	<0.002	0.047	<0.001	---	<0.002	<0.002	0.014	<0.002	0.01	---	<0.00005	<0.00005
CLH96-6	Lucchetti "Bad Water" Well	08/22/96	<0.0002	0.27	---	0.055	---	---	7.63	<0.001	---	<0.005	<0.002	0.002	0.002	16.9	---	0.0013	---
CL92-30	Mayfield Well	06/02/92	<0.002	<0.1	---	<0.05	---	---	0.03	<0.002	---	<0.002	<0.002	0.012	0.010	1.16	---	---	---
CL91-18	New Ciardella Well	03/11/91	<0.001	0.1	---	<0.05	---	---	0.11	<0.001	---	<0.002	0.002	<0.002	0.005	0.30	---	<0.1	---
CL93-49	New Ciardella Well	05/05/93	<0.001	<0.1	---	<0.05	---	---	0.02	<0.001	---	<0.002	0.002	<0.002	0.001	0.002	0.002	---	---
CL91-23	Newman Spring I	03/12/91	<0.001	<0.5	---	1.4	---	---	1.79	<0.001	---	0.002	<0.002	0.57	<0.002	1.15	---	<0.2	---
CL92-38	Newman Spring II	06/03/92	<0.002	<0.5	---	0.5	---	---	1.97	<0.002	---	<0.002	<0.002	0.12	<0.002	4.41	---	---	---
CL92-41	Pinnacle Rock Spring	06/03/92	<0.002	<0.2	---	<0.1	---	---	0.11	<0.002	---	<0.002	<0.002	<0.002	<0.002	<0.02	---	---	---
CLH96-1	Reeve's 2 Well	08/21/96	<0.0002	0.06	---	0.0035	---	---	0.08	<0.001	---	<0.002	0.020	0.006	0.008	<0.01	---	<0.0002	---
CL91-10	Spiers Spring	03/08/91	<0.001	<0.2	---	<0.1	---	---	1.68	<0.001	---	<0.002	<0.002	0.007	<0.002	1.18	---	<0.2	---
CL91-22	Sulphur Creek Spring	03/11/91	<0.001	<0.2	---	<0.1	---	---	0.52	<0.001	---	<0.002	<0.002	0.24	<0.002	0.64	---	<0.2	---
CLH96-2	Tribal 1 Well	08/21/96	<0.0002	0.15	---	0.025	---	---	0.96	<0.001	---	<0.002	<0.002	<0.002	<0.002	2.56	---	<0.0002	---
CLH96-5	Vintage Well	08/22/96	<0.0002	0.15	---	0.001	---	---	0.27	<0.001	---	<0.002	<0.002	0.008	<0.002	0.28	---	<0.0002	---
Anderson Springs Area																			
CL91-19	Anderson Hot Spring	03/11/91	<0.001	<0.1	---	<0.05	---	---	0.07	<0.001	---	0.006	<0.002	0.22	<0.002	20.0	---	<0.1	---
CL92-44	Anderson Hot Spring	06/04/92	<0.002	<0.1	---	<0.05	---	---	0.07	<0.002	---	<0.002	<0.002	0.19	<0.002	14.5	---	---	---
CL98-3	Anderson Hot Spring	09/10/98	<0.001	0.04	---	<0.0001	---	<0.002	0.10	<0.001	---	<0.002	<0.002	0.36	0.002	0.70	---	0.0002	---
CL98-5	Anderson Hot Spring	12/04/98	<0.001	0.09	---	0.0002	---	<0.002	0.069	<0.001	---	0.002	<0.002	0.21	<0.002	0.96	---	<0.0001	---
And99-2	Anderson Hot Spring	08/19/99	<0.001	<0.02	---	0.0010	---	<0.002	0.096	<0.001	---	<0.002	<0.002	0.50	<0.002	0.38	---	<0.00005	---
CL98-2	Anderson, New Hot Spring	09/10/98	<0.001	0.03	---	0.0103	---	<0.002	0.26	<0.001	---	<0.002	<0.002	0.52	0.006	0.18	---	0.0009	---
And99-4	Anderson, New Hot Spring	08/20/99	<0.001	0.13	---	0.019	---	<0.002	0.062	<0.001	---	<0.002	<0.002	0.16	<0.002	0.02	---	0.0005	---
No number	Anderson, New Hot Spring	09/16/99	<0.001	0.77	---	0.019	---	<0.002	0.046	<0.001	---	0.003	<0.002	0.15	0.004				

Table 4: Continued

Sample No.	Location	Date	Ag	Al, total ^a	Al, monomeric ^b	As	Au ^c	Be	Ba	Cd	CN	Co	Cr	Cs	Cu	Fe	Fe, raw, dig ^d	Hg	Hg, raw ^e
And99-6	Schwartz Mine Adit	08/20/99	<0.001	<0.02	---	0.0008	---	<0.002	0.019	<0.001	---	0.015	<0.002	0.54	<0.002	6.51	---	<0.0005	---
And99-8	Schwartz Mine Adit	10/05/99	<0.001	<0.02	---	0.0026	---	<0.002	0.024	<0.001	---	0.007	<0.002	0.59	<0.002	4.74	---	<0.0005	---
And99-7	Schwartz Drainage from 99-6	08/20/99	<0.001	<0.02	---	<0.0002	---	<0.002	0.047	<0.001	---	0.008	<0.002	0.47	<0.002	0.02	---	<0.0005	---
Sulphur Bank Mine Area																			
SBM95-6	Basalt (North) Pit	09/12/95	<0.001	377	---	0.0014	---	0.012	<0.002	0.001	---	1.20	0.17	0.006	0.073	156	---	---	0.00037
SB99-2	Basalt (North) Pit	08/17/99	<0.001	527	---	0.0016	---	0.014	0.006	0.016	---	0.94	0.19	0.007	0.014	322	---	0.00007	---
SB99-1	Basalt (North) Pit Spring	08/17/99	<0.001	357	---	0.0091	---	0.020	0.016	0.026	---	0.59	0.14	0.021	<0.002	854	---	<0.0005	---
SB99-15	Clear Lake, Middle Rip Rap	08/18/99	<0.001	0.18	---	0.0031	---	<0.002	0.073	<0.001	---	<0.002	<0.002	<0.002	<0.002	0.28	---	<0.0005	---
SBM97-3	Clear Lake, N. Rip Rap	11/11/97	<0.001	0.09	---	0.002	---	<0.002	0.048	<0.001	---	<0.002	0.002	0.002	0.03	---	<0.001	<0.0001	
SB99-13	Clear Lake, N. Rip Rap	08/18/99	<0.001	0.18	---	0.0024	---	<0.002	0.064	<0.001	---	<0.002	<0.002	<0.002	<0.002	0.04	---	<0.0005	---
SBM95-4	Clear Lake, S. Rip Rap	09/12/95	<0.001	<0.02	---	0.0058	---	<0.002	0.055	<0.001	---	<0.002	<0.002	<0.002	0.002	0.04	---	<0.0005	<0.0005
SBM97-4	Clear Lake, S. Rip Rap	11/11/97	<0.001	0.18	---	0.001	---	<0.002	0.053	<0.001	---	0.002	<0.002	0.003	0.07	---	0.0001	0.0001	
SB99-16	Clear Lake, S. Rip Rap	08/18/99	<0.001	1.00	---	0.0028	---	<0.002	0.062	<0.001	---	<0.002	<0.002	<0.002	<0.002	0.82	---	<0.0005	---
SBM95-7a	Frog Pond (Green Bubbling Pool)	09/12/95	<0.001	<0.02	---	0.0016	---	<0.002	0.097	<0.001	---	<0.002	<0.002	<0.002	<0.002	<0.01	---	0.00009*	0.00063
SB99-17	Green Pond	08/19/99	<0.001	8.60	---	0.0005	---	<0.002	0.11	<0.001	---	0.033	0.004	<0.002	0.011	8.80	---	<0.0005	---
CL93-54	Herman Pit, east end	09/30/93	<0.001	101	---	0.0003	---	---	<0.01	<0.001	---	0.27	0.032	0.006	0.026	19.4	---	0.0003	---
CL93-56	Herman Pit, east end	12/04/93	<0.001	95	---	0.002	---	---	0.02	<0.001	---	0.32	0.022	0.008	0.026	21.6	---	0.0006	---
SBM95-1	Herman Pit, east end	09/11/95	<0.001	96.5	---	0.0007	---	0.005	0.014	0.003	---	0.18	0.025	0.037	0.031	27.4	---	0.00010	0.0019
SBM97-1	Herman Pit, east end	11/11/97	<0.001	88.6	---	<0.001	---	0.005	0.021	<0.001	---	0.23	0.021	0.026	0.026	24.1	---	<0.0001	<0.0001
SB99-11	Herman Pit, east end	08/17/99	<0.001	83.8	---	0.0004	---	0.005	0.015	0.002	---	0.23	0.019	0.017	0.022	23.7	---	0.0015	---
SB99-10	Herman Pit, site 4	08/17/99	<0.001	83.3	---	<0.002	---	0.005	0.015	0.001	---	0.22	0.019	0.019	0.021	23.7	---	0.00029	---
SBMM00-6	Herman Pit, site 4	12/03/00	0.017	79.1	---	0.0040	---	0.0048	0.020	<0.001	---	0.23	0.023	0.046	0.027	16.4	---	<0.0005	---
CL93-63	Herman Pit, west end	12/04/93	<0.001	94	---	0.003	---	---	0.01	<0.001	---	0.30	0.026	0.006	0.026	23.2	---	<0.0005	---
SBM95-5	Herman Pit, west end	09/12/95	<0.001	96.5	---	0.0010	---	0.005	0.022	0.002	---	0.19	0.026	0.033	0.038	25.7	---	0.00033	0.00089
SBM97-2	Herman Pit, west end	11/11/97	<0.001	89.5	---	<0.001	---	0.005	0.020	<0.001	---	0.22	0.021	0.020	0.024	24.5	---	0.0012	0.0012
SB99-9	Herman Pit, west end	08/17/99	<0.001	84.8	---	0.0006	---	0.005	0.015	0.001	---	0.23	0.018	0.023	0.022	23.3	---	0.00063	---
SB99-12	Rip-Rap Seep	08/18/99	<0.001	5.08	---	0.0003	---	<0.002	0.057	<0.001	---	0.053	0.005	0.007	0.011	0.47	---	0.00036	---
SBM95-3	Well CL #1, leaking geothermal fluid	09/11/95	<0.001	0.12	---	0.044	---	<0.002	0.54	0.15	---	<0.002	0.005	0.007	<0.002	0.87	---	0.0035	0.066
SBMM00-5	Well CL #1, leaking geothermal fluid	12/01/00	0.021	0.045	---	0.0056	---	<0.001	2.10	<0.001	---	<0.001	0.022	0.053	0.014	2.15	---	0.0012	---
Sulphur Creek Mining District																			
SC94-14	Bear Creek, upstn of Sulphur Creek	05/23/94	<0.0005	<0.05	---	0.002	<0.002	---	0.24	<0.0005	0.52	<0.002	<0.002	<0.002	<0.01	0.05	0.0004	0.0005	
SC94-15	Bear Creek, dwstm of Sulphur Creek	05/23/94	<0.0005	<0.05	---	<0.002	<0.002	---	0.3	<0.0005	0.71	<0.002	<0.002	0.014	0.004	<0.01	0.22	0.0002	0.0003
CL93-66	Blanck Hot Spring	12/05/93	<0.01	<0.1	---	0.004	---	---	3.7913223	<0.01	---	<0.01	<0.01	0.41	<0.01	0.03	---	0.0013	---
SC94-10	Blanck Hot Spring	05/22/94	<0.005	<0.1	---	0.01	<0.01	---	3.86	<0.005	7.63	<0.01	<0.01	0.49	0.01	0.03	0.05	0.0070	0.0069
CLJ95-9	Blanck Hot Spring	12/20/95	<0.001	0.04	---	0.063	---	---	3.21	<0.002	---	<0.005	<0.005	0.55	0.023	<0.02	---	0.0065	---
CL93-51	Elbow Hot Spring	09/30/93	<0.01	1.8	---	0.0011	---	---	1.18	<0.01	---	<0.02	<0.02	1.48	<0.02	1.5	---	0.0138	---
CL93-65	Elbow Hot Spring	12/05/93	<0.01	<0.1	---	0.0006	---	---	1.2190083	<0.01	---	<0.01	<0.01	0.87	<0.01	0.17	---	0.0023	---
CL96-3	Elbow Hot Spring (anions only)	06/15/96	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
CLJ95-8	Elbow Hot Spring	12/19/95	<0.001	0.04	---	<0.001	---	---	1.22	<0.002	---	<0.005	<0.005	1.16	0.029	0.03	---	0.023	---
SC94-13	Elbow Hot Spring	05/23/94	<0.005	<0.1	---	<0.01	<0.01	---	1.16	<0.005	8.94	<0.01	<0.01	1.06	0.03	0.06	0.09	0.052	0.061
CL93-67	Elgin Hot Spring Main	12/06/93	<0.01	<0.1	---	<0.0005	---	---	3.1404959	<0.01	---	<0.01	<0.01	0.66	0.02	0.03	---	0.0050	---
SC94-20	Elgin Hot Spring Main	05/24/94	<0.005	<0.1	---	<0.01	<0.01	---	2.96	<0.005	1.35	<0.01	<0.01	0.66	0.02	<0.02	0.78	0.0070	0.011
CL96-1	Elgin Hot Spring Main (anions only)	06/15/96	---	---	---	<0.01	<0.01	---	---	---	---	---	---	---	---	---	---	---	
SC94-19	Elgin Hot Spring, Orange Bathtub	05/24/94	<0.005	<0.1	---	<0.01	<0.01	---	3.44	<0.005	8.24	<0.01	<0.01	0.62	0.02	0.02	0.50	0.0002	0.0007
CL91-12	Jones Hot Spring	03/09/91	<0.002	<1	0.043	1.2	---	---	1.41	<0.002	---	<0.004	<0.004	0.62	<0.004	<0.1	---	<1	---
CL92-34	Jones Hot Spring	06/02/92	<0.002	<1	---	0.1	---	---	1.53	<0.002	---	<0.002	<0.002	1.06	<0.002	<0.01	---	---	---
SC94-12	Jones Hot Spring	05/23/94	<0.005	<0.1	---	<0.01	<0.01	---	1.36	<0.005	1.27	<0.01	<0.01	0.80	0.03	0.02	0.40	0.0135	0.022
CL95-6	Jones Hot Spring	04/01/95	<0.005	0.02	---	<0.01	---	---	1.32	<0.005	---	0.012	<0.01	0.55	<0.01	0.07	---	0.0049	---
CL95-Oct95	Jones Hot Spring	10/12/95	<0.005	0.14	---	0.0010	---	<0.002	1.33	<0.005	---	<0.01	<0.01	0.50	<0.01	0.14	---	0.0017	---
CL96-5	Jones Hot Spring (anions only)	06/16/96	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
SC94-1	Sulphur Creek	05/21/94	<0.005	0.47	---	<0.01	<0.01	---	0.74	<0.005	3.61	<0.01	<0.01	0.18	0.02	0.12	1.44	0.0004	0.0011
SC94-3	Sulphur Creek	05/21/94	<0.005	0.49	---	<0.01	<0.01	---	0.78	<0.005	3.50	<0.01	<0.01	0.19	<0.01	0.13	1.07	0.0004	0.0007
SC94-6	Sulphur Creek	05/22/94	<0.005	0.2	---	0.01	<0.01	---	0.88	<0.005	3.90	<0.01	<0.01	0.25	0.02	0.23	1.01	0.0002	0.0002
SC94-7	Sulphur Creek	05/22/94	<0.005	0.19	---	<0.01	<0.01	---	1.03	<0.005	4.74	<0.01	<0.01	0.33	0.03	0.26	0.75	0.0004	0.001
SC94-9	Sulphur Creek	05/22/94	<0.005	0.17	---	<0.01	<0.01	---	0.9	<0.005	4.65	<0.01	<0.01	0.30	<0.01	0.12	0.25	0.0003	0.0004
SC94-11	Sulphur Creek	05/22/94	<0.005	0.14	---	<0.01	<0.01	---	0.24	<0.005	2.27	<0.01	<0.01	0.03	0.02	0.02	0.05	<0.0002	0.0002
SC94-25A	Sulphur Creek @ Elbow Spring	08/94	<0.005	0.85	---	0.0052	---	---	1.63	<0.005	0.52	<0.02	<0.02	0.63	0.04	0.33	---	0.0035	---
94T16	Sulphur Creek upstream of Jones	05/01/94	<0.005	0.16	---	<0.01</													

Table 4: Continued

Sample No.	Location	Date	Ag	Al, total ^a	Al, monomeric ^b	As	Au ^c	Be	Ba	Cd	CN	Co	Cr	Cs	Cu	Fe	Fe, raw, dig ^d	Hg	Hg, raw ^e
CL93-47	Turkey Run Mine Spring	05/05/93	<0.001	<0.1	---	<0.05	---	---	0.03	<0.001	---	<0.002	0.002	0.025	0.006	0.12	---	---	
SC94-16	Turkey Run Mine Spring	05/24/94	<0.002	<0.05	---	<0.005	<0.005	---	0.03	<0.002	0.83	<0.005	0.004	0.064	<0.01	0.14	0.63	<0.0002	0.0002
CL95-5	Turkey Run Mine Spring	04/01/95	<0.002	0.24	---	<0.01	---	---	0.04	<0.002	---	0.037	<0.005	0.02	<0.005	31.0	---	0.0002	---
SC94-2	Unnamed Hot Spring	05/21/94	<0.005	<0.1	---	<0.01	<0.01	---	1.11	<0.005	8.57	<0.01	<0.01	1.18	<0.01	<0.02	0.06	0.0037	0.0043
CL93-52	Wilbur Spring, Don White's site	09/30/93	<0.01	<0.2	---	<0.0002	---	---	1.24	<0.01	---	0.02	<0.02	1.28	<0.02	0.37	---	0.0071	---
SC94-4	Wilbur Spring, Don White's site	05/21/94	<0.005	<0.1	---	<0.01	<0.01	---	1.43	<0.005	9.47	<0.01	<0.01	1.02	<0.01	0.04	0.08	0.0053	0.0064
CLJ95-10	Wilbur Spring, Don White's site	12/20/95	<0.001	0.09	---	<0.001	---	---	1.12	<0.002	---	<0.005	<0.005	0.89	<0.005	<0.02	---	0.0064	---
CL91-13	Wilbur Hot Spring, Main	03/09/91	<0.002	<1	---	1.2	---	---	1.34	<0.002	---	<0.004	<0.004	0.74	<0.004	<0.1	---	<1	---
CL92-33	Wilbur Hot Spring, Main	06/02/92	<0.002	<0.1	---	0.5	---	---	1.39	<0.002	---	<0.002	<0.002	1.21	<0.002	0.21	---	---	---
SC94-5	Wilbur Hot Spring, Main	05/21/94	<0.005	<0.1	---	<0.01	<0.01	---	1.34	<0.005	7.96	<0.01	<0.01	0.73	0.01	0.02	<0.02	0.0056	0.0067
CL96-4	Wilbur Hot Spring, Main (anions only)	06/15/96	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
CL93-53	Wilbur, spring between Main and road	09/30/93	<0.01	<0.2	---	<0.0002	---	---	1.26	<0.01	---	0.04	<0.02	1.28	<0.02	<0.01	---	0.0075	---

^aTotal aluminum analyzed on filtered, acidified sample.^bSeparate sample for monomeric aluminum species collected as per Barnes et al. (1975) and analyzed by graphite furnace atomic absorption (GFAA).^cSeparate sample filtered through 0.45-micron paper into 125-ml glass bottle, acidified in field with 2 ml of aqua regia, and analyzed by GFAA.^dRaw sample digested per EPA 3015, then filtered through 0.45-micron paper, and the supernatant analyzed by inductively coupled plasma (ICP-AES).^eSeparate raw sample collected into 125-ml plastic bottle, preserved with 2 ml of K₂Cr₂O₇ solution, and analyzed by cold vapor atomic absorption (AA).^fSeparate raw sample collected into 60-ml plastic bottle, preserved with 2 NaOH pellets, and analyzed by specific ion electrode.^gTOC = total organic carbon

Table 4: Continued

Sample No.	I	Mn	Mo	NH ₄	Ni	NO ₂	NO ₃	OH	Pb	PO ₄	Rb	S'	Sb	Se	Sn	SO ₃	S ₂ O ₃	Ti	Tl	TOC ^s	V	Zn
<i>The Geysers - Clear Lake Region, General Locations</i>																						
CL93-45	0.02	1.09	<0.002	0.31	0.010	<0.05	1.92	0	0.002	<0.05	0.010	---	<0.1	---	---	---	<0.01	---	---	---	---	0.02
CL91-27	<0.01	<0.01	<0.002	0.47	0.003	<0.05	0.98	0	<0.002	<0.1	0.007	---	<0.1	<0.1	---	---	<0.01	---	---	---	---	0.02
CL91-8	0.39	0.56	<0.002	14.6	<0.002	<0.05	<0.02	0	<0.002	0.67	0.075	<0.02	<0.1	<0.1	---	---	<0.01	---	---	---	---	<0.01
CL92-37	0.08	0.35	<0.002	11.8	0.041	<0.02	<0.02	0	<0.002	<0.05	0.016	---	<0.1	---	---	---	<0.02	---	---	---	---	<0.02
CL91-5	10.5	0.25	<0.002	138	0.002	340	3.73	0	0.01	<0.2	0.46	---	<0.5	<0.5	---	---	<0.01	---	---	---	---	<0.05
CL92-29	11.4	0.30	<0.002	179	<0.005	345	0.56	0	<0.002	<0.2	0.60	---	<1	---	---	---	<0.02	---	---	---	---	0.03
CL96-6	11.1	---	---	---	---	<0.2	<0.2	0	---	<0.5	---	<0.02	---	---	---	<0.5	<0.2	---	---	---	---	---
CL91-14	<0.01	<0.01	<0.002	0.07	0.014	<0.05	0.09	0	<0.002	<0.1	0.002	---	<0.1	<0.1	---	---	<0.01	---	---	---	---	<0.01
SBM95-8	<0.01	<0.002	<0.002	0.15	<0.002	<0.02	<0.02	2.5	<0.002	0.55	<0.002	---	0.0003	<0.0001	---	<0.05	<0.01	<0.002	<0.002	---	<0.002	<0.01
CL91-2	0.13	0.52	<0.002	<0.05	<0.002	<0.05	0.05	0	0.003	<0.1	0.027	---	<0.1	<0.2	---	---	<0.01	---	---	---	---	0.02
CL92-42	<0.02	0.51	<0.002	5.68	<0.002	<0.02	0.06	0	<0.002	<0.05	0.026	---	<0.1	---	---	---	<0.02	---	---	---	---	<0.01
CL93-70	5.35	<0.01	<0.01	0.80	<0.01	<0.1	<0.1	0	<0.02	3.34	0.08	<0.01	<0.001	<0.001	---	---	<0.01	---	---	---	---	<0.01
CL91-17	9.8	0.73	<0.004	182	<0.004	<0.2	0.74	0	<0.004	1.81	0.53	<0.02	0.2	<0.5	---	---	<0.01	---	---	---	---	<0.05
CL92-31	11.1	0.88	<0.002	312	<0.005	288	0.16	0	<0.002	0.93	0.55	---	<1	---	---	---	<0.02	---	---	---	---	0.04
CL91-25	<0.01	0.01	<0.002	0.94	0.003	<0.05	0.63	0	<0.002	<0.1	0.004	---	<0.1	<0.1	---	---	<0.01	---	---	---	---	<0.01
CL93-69	0.02	<0.01	<0.002	0.06	0.007	<0.01	<0.01	0	<0.002	0.1	0.002	<0.01	<0.001	<0.001	---	<0.01	---	---	---	---	---	<0.01
SBM97-5	<0.01	0.006	<0.002	0.11	<0.002	<0.02	---	<0.002	<0.05	<0.002	---	<0.001	<0.001	---	<0.02	<0.01	<0.002	---	---	<0.002	---	<0.01
CL91-3	<0.01	<0.01	<0.002	<0.05	<0.002	<0.05	0.98	0	<0.002	0.11	0.006	---	<0.1	<0.1	---	---	<0.01	---	---	---	---	<0.01
CL91-15	33.4	<0.1	<0.004	112	<0.004	<0.2	36.2	228	0.014	<0.4	0.35	0.35	<1	<1	---	---	6.4	---	---	---	---	<0.1
CL92-36	43	<0.01	<0.002	146	<0.005	<0.2	0.64	433	0.014	<0.5	0.43	---	<0.1	---	---	---	9.42	---	---	---	---	<0.01
CL96-2	37.1	---	---	---	---	<1	4.7	277	---	<1	---	<0.02	---	---	---	<1	6.64	---	---	---	---	<0.01
CLH96-4	0.26	0.24	0.023	12.8	0.007	<0.02	0.22	---	<0.002	<0.05	<0.002	---	<0.0002	<0.0002	---	<0.05	<0.02	---	---	---	---	<0.01
CL92-40	1.76	<0.05	<0.002	33.8	0.007	<0.05	<0.05	0	<0.002	1.25	0.032	---	<0.5	---	---	---	<0.02	---	---	---	---	<0.01
CLH96-3	0.06	0.15	0.039	0.23	0.12	<0.02	0.12	---	<0.002	<0.05	0.002	---	<0.0002	<0.0002	---	<0.05	<0.02	---	---	---	---	<0.01
CL91-9	0.69	0.08	<0.002	4.56	0.025	<0.05	<0.02	0	<0.002	0.16	0.026	---	<0.1	<0.2	---	---	<0.01	---	---	---	---	<0.02
CL91-24	<0.01	0.81	<0.002	0.56	0.14	<0.05	0.17	0	<0.002	<0.1	0.003	<0.02	<0.1	<0.1	<0.1	---	<0.01	---	---	---	---	0.06
CL91-20	<0.01	0.01	<0.002	0.05	<0.002	<0.05	<0.02	0	<0.002	<0.1	0.020	---	<0.1	<0.1	<0.1	---	<0.01	---	---	---	---	<0.01
CL92-43	<0.02	<0.01	<0.002	0.11	<0.002	<0.02	<0.02	0	<0.002	<0.05	0.014	---	<0.1	---	---	---	<0.02	---	---	---	---	<0.01
CL91-21	0.16	0.03	<0.002	1.39	0.003	<0.05	0.13	0	<0.002	<0.1	0.032	---	<0.1	<0.1	<0.1	---	<0.01	---	---	---	---	0.01
CL91-16	10.8	<0.05	<0.004	16.5	<0.004	140	<0.2	0	<0.004	2.12	0.09	<0.02	<0.5	<0.5	---	---	<0.01	---	---	---	---	<0.05
CL92-32	11.5	0.04	<0.002	32.9	0.006	98	0.68	0	<0.002	1.82	0.088	---	<1	---	---	---	<0.02	---	---	---	---	<0.05
CL91-4	0.69	0.30	<0.002	11.1	<0.002	<0.05	<0.02	0	<0.002	<0.1	0.042	---	<0.1	<0.2	---	---	<0.01	---	---	---	---	<0.02
CL92-35	0.22	0.26	<0.002	9.60	<0.002	<0.2	0.04	0	<0.002	<0.05	0.051	---	<0.1	---	---	---	<0.02	---	---	---	---	<0.01
CL93-50	0.06	1.47	<0.002	3.50	<0.002	<0.02	<0.02	0	<0.002	<0.05	0.011	---	<0.1	---	---	---	<0.01	---	---	---	---	<0.01
CL91-26	1.27	0.06	<0.002	15.0	0.009	<0.05	0.19	0	<0.002	0.42	0.042	---	<0.1	<0.2	---	---	<0.01	---	---	---	---	0.02
CL91-11	<0.01	<0.01	<0.002	0.05	<0.002	<0.05	<0.02	0	<0.002	<0.1	0.022	---	<0.1	<0.1	<0.1	---	<0.01	---	---	---	---	<0.01
CL93-72	<0.01	0.20	<0.002	1.45	0.007	<0.05	1.63	0	<0.002	0.74	0.14	<0.01	<0.001	<0.001	---	<0.01	---	---	---	---	---	<0.01
SBM95-9	0.09	<0.002	<0.002	<0.02	<0.002	<0.02	19.5	0	<0.002	<0.05	0.034	---	<0.0001	<0.0001	<0.0001	---	<0.05	<0.01	<0.002	---	<0.002	<0.01
CLH96-6	0.02	0.59	<0.002	0.49	0.003	<0.02	<0.02	---	<0.002	<0.05	0.003	---	<0.0002	<0.0002	<0.0002	---	<0.05	<0.02	---	---	---	0.01
CL92-30	<0.02	0.02	<0.002	2.99	<0.005	<0.2	0.03	0	<0.002	<0.05	0.032	---	<0.2	---	---	---	<0.02	---	---	---	---	0.03
CL91-18	<0.01	0.68	<0.002	0.08	0.002	<0.05	<0.02	0	<0.002	4.9	0.006	---	<0.1	<0.1	<0.1	---	<0.01	---	---	---	---	0.05
CL93-49	<0.01	<0.02	<0.05	<0.002	<0.02	0.12	0	<0.002	0.28	0.034	---	<0.1	---	---	---	<0.01	---	---	---	---	---	0.82
CL91-23	1.23	0.15	<0.002	86.2	0.008	<0.05	0.7	0	<0.008	0.31	0.17	---	<0.5	<0.5	---	---	<0.01	---	---	---	---	<0.05
CL92-38	0.67	<0.05	<0.002	44.5	0.030	118	0.41	0	<0.002	<0.05	0.036	---	<0.5	---	---	---	<0.02	---	---	---	---	<0.05
CL92-41	<0.02	<0.02	<0.04	<0.002	<0.02	0	<0.002	<0.05	<0.002	<0.2	---	---	<0.2	---	---	---	<0.02	---	---	---	---	<0.02
CLH96-1	<0.02	<0.01	<0.002	0.10	0.027	<0.02	1.34	---	0.003	<0.05	<0.002	---	0.0010	<0.0002	---	<0.05	<0.02	---	---	---	---	0.04
CL91-10	2.73	0.16	<0.002	32.8	0.019	<0.05	0.11	0	<0.002	<0.1	0.037	---	<0.1	<0.2	---	---	<0.01	---	---	---	---	<0.02
CL91-22	0.19	0.76	<0.002	12.0	0.004	<0.05	<0.02	0	<0.002	<0.1	0.074	<0.02	<0.1	<0.2	---	---	<0.01	---	---	---	---	<0.02
CLH96-2	0.05	0.23	<0.002	7.77	<0.002	<0.02	<0.02	---	<0.002	5.03	<0.002	---	<0.0002	<0.0002	<0.0002	---	<0.05	<0.02	---	---	---	<0.01
CLH96-5	0.12	0.75	0.014	0.47	<0.002	<0.02	<0.02	---	<0.002	<0.05	<0.002	---	<0.0002	<0.0002	<0.0002	---	<0.05	<0.02	---	---	---	0.28
<i>Anderson Springs Area</i>																						
CL91-19	<0.01	9.52	<0.002	18.9	0.062	<0.05	0.05	0	<0.002	<0.1	0.11	<0.02	<0.1	<0.1	---	<0.01	---	---	---	---	---	0.01
CL92-44	<0.02	8.92	<0.0																			

Table 4: Continued

Sample No.	I	Mn	Mo	NH ₄	Ni	NO ₂	NO ₃	OH	Pb	PO ₄	Rb	S'	Sb	Se	Sn	SO ₃	S ₂ O ₃	Ti	Tl	TOC ^s	V	Zn
And99-6	<0.01	4.48	<0.002	14.1	0.11	<0.02	3.86	---	<0.002	<0.05	0.14	0.91	0.0006	<0.0001	---	<0.05	<0.01	<0.002	<0.002	---	<0.002	<0.01
And99-8	<0.01	3.91	<0.002	17.9	0.057	<0.02	0.75	0	<0.002	<0.05	0.17	---	0.0004	<0.0001	---	<0.05	<0.01	<0.002	<0.002	<0.002	<0.002	<0.01
And99-7	<0.01	2.88	<0.002	0.80	0.14	<0.02	28.4	---	<0.002	<0.05	0.11	---	0.0004	<0.0001	---	<0.05	<0.01	<0.002	0.003	---	<0.002	0.07
Sulphur Bank Mine Area																						
SBM95-6	<0.01	4.85	<0.002	20.4	0.51	<0.02	<0.02	0	<0.002	<0.05	0.011	---	0.0001	<0.0001	---	<0.05	<0.01	<0.002	<0.002	---	<0.002	1.23
SB99-2	<0.01	6.63	<0.002	19.6	0.52	<0.05	<0.05	---	0.002	<0.1	0.012	---	0.0004	<0.0001	---	<1	<0.01	<0.002	<0.002	---	0.019	1.24
SB99-1	<0.01	8.67	<0.002	63.4	0.36	<0.05	<0.05	---	0.002	<0.1	0.039	---	0.0005	<0.0001	---	<1	<0.01	<0.002	<0.002	---	0.15	1.01
SB99-15	<0.01	0.048	<0.002	0.06	0.003	<0.02	<0.02	---	<0.002	<0.05	<0.002	---	0.0016	<0.0001	---	<0.05	<0.01	0.002	<0.002	---	<0.002	<0.01
SBM97-3	<0.01	0.007	<0.002	2.06	0.003	<0.02	0.49	---	<0.002	0.50	<0.002	---	0.002	<0.001	---	<0.02	<0.01	<0.002	---	0.002	<0.01	
SB99-13	<0.01	0.038	<0.002	0.55	0.002	<0.02	0.18	---	<0.002	<0.05	<0.002	---	0.0004	<0.0001	---	<0.05	<0.01	<0.002	<0.002	---	0.003	0.01
SBM95-4	<0.01	0.007	<0.002	0.70	0.002	<0.02	<0.02	0	<0.002	0.51	0.002	0.04*	0.0005	<0.0001	---	<0.05	<0.01	<0.002	<0.002	---	<0.002	<0.01
SBM97-4	<0.01	0.14	<0.002	2.74	0.006	5.25	0.58	---	<0.002	<0.05	<0.002	---	<0.001	<0.0001	---	<0.02	<0.01	<0.002	---	0.002	<0.01	
SB99-16	<0.01	0.075	<0.002	<0.02	0.002	0.46	0.33	---	<0.002	<0.05	<0.002	---	0.0009	<0.0001	---	<0.05	<0.01	0.003	<0.002	---	<0.002	0.01
SBM95-7a	<0.01	<0.002	<0.002	<0.02	<0.002	<0.02	0	<0.002	<0.05	<0.002	---	0.0004	<0.0001	---	<0.05	<0.01	<0.002	<0.002	---	<0.002	<0.01	
SB99-17	<0.01	1.94	<0.002	0.03	0.10	<0.02	<0.02	---	<0.002	<0.05	0.008	---	0.0001	<0.0001	---	<0.05	<0.01	<0.002	<0.002	---	<0.002	0.54
CL93-54	<0.01	14.1	<0.002	288	0.68	<0.02	0.25	0	<0.002	<0.2	0.007	<0.02	<0.001	<0.001	---	<0.01	---	---	---	---	---	0.82
CL93-56	<0.01	13.6	<0.005	355	0.91	<0.05	0.43	0	<0.005	0.88	0.010	<0.01	0.002	<0.001	---	<0.01	---	---	---	---	---	0.84
SBM95-1	<0.01	12.4	<0.002	254	0.57	<0.1	0.32	0	<0.002	<0.05	0.017	<0.01*	0.0009	<0.0001	---	<0.05	<0.01	<0.002	<0.002	---	<0.002	0.82
SBM97-1	0.02	11.5	<0.01	224	0.54	<0.1	0.47	---	<0.002	<0.5	0.024	---	0.003	<0.001	---	<0.1	0.02	<0.002	---	0.002	0.80	
SB99-11	<0.01	10.7	<0.002	192	0.52	<0.05	0.09	---	0.008	<0.1	0.024	---	0.0004	<0.0001	---	<1	<0.01	<0.002	<0.002	---	<0.002	0.75
SB99-10	<0.01	10.6	<0.002	190	0.51	<0.05	0.10	---	<0.002	<0.1	0.025	---	0.0005	<0.0001	---	<1	<0.01	<0.002	<0.002	---	<0.002	0.76
SBMM00-6	<0.01	11.2	<0.001	266	0.53	<0.04	<0.04	---	<0.001	<0.1	0.046	---	0.0023	<0.0001	<0.1	<0.01	0.10	<0.001	0.001	0.001	0.001	0.63
CL93-63	<0.01	13.7	<0.005	365	0.91	<0.05	0.48	0	<0.005	0.59	0.010	<0.01	0.003	<0.001	---	<0.01	---	---	---	---	---	0.84
SBM95-5	<0.01	12.0	<0.002	263	0.58	<0.02	<0.02	0	<0.002	0.56	0.020	<0.01*	0.0010	<0.0001	---	<0.05	<0.01	<0.002	<0.002	---	<0.002	0.80
SBM97-2	0.02	11.8	<0.01	220	0.53	<0.1	<0.1	---	<0.002	<0.5	0.024	---	0.005	<0.001	---	<0.1	0.03	<0.002	---	0.002	0.76	
SB99-9	<0.01	10.8	<0.002	192	0.51	<0.05	<0.05	---	<0.002	<0.1	0.026	---	0.0004	<0.0001	---	<1	<0.01	<0.002	<0.002	---	<0.002	0.73
SB99-12	<0.01	1.98	<0.002	28.3	0.11	<0.02	1.65	---	<0.002	<0.05	0.004	---	0.0011	<0.0001	---	<0.1	<0.01	<0.002	<0.002	---	<0.002	0.19
SBM95-3	3.79	0.56	<0.002	535	0.003	<0.02	<0.1	26.1	<0.002	0.33	0.018	0.01*	0.059	<0.0001	---	<0.05	<0.01	0.034	<0.002	0.027	0.01	
SBMM00-5	3.44	1.88	<0.001	682	0.005	<0.1	<0.04	---	<0.001	0.40	0.052	0.06	0.0009	<0.001	<0.1	9.74	0.022	<0.001	448	0.016	0.010	
Sulphur Creek Mining District																						
SC94-14	0.09	<0.01	<0.002	0.11	0.004	<0.02	<0.02	0	<0.002	<0.05	0.013	<0.01	<0.002	---	---	<0.05	---	---	<2	---	0.01	
SC94-15	0.23	0.02	<0.002	3.85	0.004	<0.1	7.67	0	<0.002	<0.05	0.035	<0.01	<0.002	---	---	<0.05	---	---	<2	---	<0.01	
CL93-66	18.6	<0.01	<0.01	348	0.03	<0.2	<0.2	0	<0.02	<0.5	1.03	46.9	0.003	<0.001	---	0.43	---	---	---	---	---	<0.02
SC94-10	20.3	<0.02	<0.01	402	<0.01	<2	<0.2	0	<0.01	<0.5	1.08	24.8	0.02	<0.01	---	<0.05	---	---	<2	---	<0.05	
CLJ95-9	4.82	0.02	<0.005	233	<0.005	<10	5.96	---	<0.01	<0.5	0.63	<0.05	0.31	<0.001	---	<1	<0.05	---	---	---	---	<0.02
CL93-51	27.9	0.02	<0.02	320	0.02	<0.1	<0.1	0	<0.02	2.2	1.26	0.22	0.002	<0.001	---	<0.1	---	---	---	---	---	<0.01
CL93-65	28.4	0.01	<0.01	458	0.06	<0.2	<0.2	0	<0.02	2.56	1.16	1.88	<0.001	<0.001	---	<0.01	---	---	---	---	---	<0.02
CL96-3	27.4	---	---	---	<1	<0.2	<0.2	0	---	<0.5	---	17.1	---	---	5.46	24.8	---	---	---	---	---	
CLJ95-8	26	<0.02	<0.005	355	<0.005	<10	<0.2	---	<0.01	1.19	0.72	<0.05	0.0011	<0.001	---	<1	0.31	---	---	---	---	0.02
SC94-13	29.6	0.02	<0.01	506	<0.01	<0.2	<0.2	0	<0.01	2.2	1.26	<0.01	0.01	<0.01	---	<0.05	---	---	10	---	0.07	
CL93-67	25.5	<0.01	<0.01	463	<0.01	<0.2	<0.2	0	<0.02	<0.5	1.28	6.89	<0.001	<0.001	---	0.06	---	---	---	---	---	<0.02
SC94-20	28.5	<0.02	<0.01	791	<0.01	<0.2	<0.2	0	<0.01	<0.5	1.33	0.52	0.01	<0.01	---	<0.05	---	---	<2	---	<0.05	
CL96-1	25.7	---	---	---	<1	<0.2	<0.2	0	---	<0.5	---	64.1	---	---	11.8	154	---	---	---	---	---	
SC94-19	30.2	0.02	<0.01	753	<0.01	<0.2	<0.2	0	<0.01	<0.5	1.29	<0.01	0.01	<0.01	---	<0.05	---	---	27	---	0.05	
CL91-12	22.4	<0.1	<0.004	218	<0.004	<0.2	<0.1	0	0.008	1.71	1.36	0.02	<1	<1	---	<0.01	---	---	---	---	---	<0.1
CL92-34	24.4	<0.01	<0.002	303	<0.005	<0.2	<0.2	0	0.005	1.4	1.12	---	<1	---	---	<0.02	---	---	---	---	---	0.01
SC94-12	26.1	<0.02	<0.01	434	<0.01	<0.2	<0.2	0	<0.01	<0.5	1.08	0.60	0.01	<0.01	---	<0.05	---	---	<2	---	<0.05	
CL95-6	22.2	0.01	<0.01	468	<0.005	<0.5	<0.2	---	<0.02	0.52	0.67	---	0.04	<0.01	---	<0.1	---	---	---	---	---	<0.01
CL95-Oct95	24.2	0.019	<0.01	248	<0.01	<0.02	<0.02	0	0.006	1.18	0.79	---	0.12	<0.0001	---	<0.05	<0.01	0.002	<0.01	---	<0.002	0.01
CL96-5	19.8	---	---	---	<0.5	<0.2	0	---	<0.5	---	0.08	---	---	<1	<0.5	---	---	---	---	---	---	
SC94-1	8.54	0.19	<0.01	120	<0.01	205	3.15	0	<0.01	<0.5	0.31	<0.01	0.02	<0.01	---	<0.05	---	---	27	---	0.03	
SC94-3																						

Table 4: Continued

Sample No.	I	Mn	Mo	NH ₄	Ni	NO ₂	NO ₃	OH	Pb	PO ₄	Rb	S'	Sb	Se	Sn	SO ₃	S ₂ O ₃	Ti	Tl	TOC ^s	V	Zn
CL93-47	2.11	0.26	<0.002	22.7	0.030	<0.05	<0.05	0	<0.002	<0.1	0.072	---	<0.1	---	---	---	<0.01	---	---	---	---	<0.01
SC94-16	1.82	0.13	<0.005	36.1	<0.005	<0.2	<0.05	0	<0.005	0.35	0.082	<0.01	0.004	<0.004	---	---	<0.05	---	---	<2	---	0.01
CL95-5	2.54	2.65	<0.005	44.4	0.023	<0.1	<0.05	---	<0.01	<0.5	0.07	---	<0.005	<0.01	---	---	<0.1	---	---	---	---	<0.01
SC94-2	28.3	<0.02	<0.01	889	<0.01	<2	<0.2	0	<0.01	<0.5	0.96	0.02	<0.01	<0.01	---	---	<0.05	---	---	32	---	<0.05
CL93-52	23.7	0.02	<0.02	307	<0.02	<0.1	<0.1	0	<0.02	<0.5	1.16	4.41	0.021	<0.001	---	---	35.4	---	---	---	---	<0.01
SC94-4	25.6	0.02	<0.01	753	<0.01	<2	<0.2	0	<0.01	<0.5	0.90	0.22	<0.01	<0.01	---	---	<0.05	---	---	22	---	0.07
CLJ95-10	9.82	<0.02	<0.005	275	<0.005	<10	<0.2	---	<0.01	<0.5	0.69	<0.05	0.018	<0.001	---	<1	0.39	---	---	20.8	---	<0.02
CL91-13	22.1	<0.1	<0.004	214	<0.004	<0.2	<0.1	0	<0.004	0.74	1.32	39.7	<1	1	---	---	<0.01	---	---	---	---	<0.1
CL92-33	23.6	<0.05	<0.002	312	<0.005	<0.2	<0.2	0	0.01	0.88	1.07	---	<1	---	---	---	78.3	---	---	---	---	0.04
SC94-5	26.6	<0.02	<0.01	818	<0.01	<2	<0.2	0	<0.01	<0.5	0.82	<0.01	0.02	<0.01	---	---	<0.05	---	---	43	---	<0.05
CL96-4	19.7	---	---	---	---	<0.5	<0.2	0	---	<0.5	---	61.2	---	---	---	9.88	27.3	---	---	---	---	---
CL93-53	23.9	<0.02	<0.02	283	<0.02	<0.1	<0.1	0	<0.02	1.3	1.16	50.1	0.008	<0.001	---	---	164	---	---	---	---	<0.01

Table 5: Stable isotope and tritium data for thermal and nonthermal waters in The Geysers-Clear Lake region, California.^a

Sample No.	Location	Laboratory ^b	Date	$\delta D\text{-H}_2O$ (‰)	$\delta^{18}O\text{-H}_2O$ (‰)	$^3H\text{-H}_2O$ (T.U.)	$\delta^{13}C\text{-DIC}$ (‰)
<i>The Geysers - Clear Lake Region, General Locations</i>							
CL93-45	Adams Spring	SMU	05/04/93	-56.9	-8.89	nc	nc
CL91-27	Adrienne's Well	SMU	03/13/91	-16.2	0.22	nc	nc
CL91-8	Ag. Park Well #3	SMU;UM;USGS	03/08/91	-60.1	-7.57	0.09	-10.99
CL92-37	Allen Spring	SMU;UM;USGS	06/03/92	-59.4	-6.27	1.29	-9.07
CL91-5	Baker Soda Spring	SMU;UM;USGS	03/07/91	-38.9	-1.60	0.04	-3.20
CL92-29	Baker Soda Spring	SMU;USGS	06/02/92	-35.8	-0.15	nc	-5.32
CL96-6	Baker Soda Spring	USGS	06/17/96	nc	nc	nc	-5.2
CL91-14	Barrel Spring	SMU;UM	03/09/91	-61.6	-8.65	8.49	nc
SBM95-8	Big Mother Spring	USGS	09/13/95	-35.0	-3.91	nc	nc
CL91-2	Big Soda Spring	SMU;UM;USGS	03/06/91	-58.6	-7.91	0.09	-10.40
CL92-42	Big Soda Spring	SMU	06/04/92	-56.1	-6.15	nc	nc
CL93-70	Borax Lake	SMU	12/07/93	-13.9	1.97	nc	nc
CL91-17	Chalk Mt. Spring	SMU;UM;USGS	03/09/91	-37.7	-2.71	1.05	-6.59
CL92-31	Chalk Mt. Spring	SMU;USGS	06/02/92	-42.9	-2.60	-	-6.58
CL91-25	Clear Lake, Konocti Bay	SMU;UM	03/13/91	-19.7	-0.21	5.04	nc
SBM97-5	Clear Lake, Clearlake Highlands	WM;UM	11/16/97	-25.0	-4.20	3.04	nc
CL91-3	Cold Spring near Cross Spring	SMU;UM	03/07/91	-53.9	-7.48	3.64	nc
CL91-15	Complexion Spring	SMU;UM;USGS	03/09/91	2.8	2.25	1.44	-13.55
CL92-36	Complexion Spring	SMU	06/03/92	12.9	3.98	nc	nc
CL96-2	Complexion Spring	USGS	06/15/96	nc	nc	nc	-12.7
CLH96-4	Coppage Spring	USGS	08/22/96	nc	nc	nc	-8.2
CL95-13	Crabtree Gas Seep	SMU;DB	07/21/95	-61.0	-8.66	nc	-10.2
CL92-40	Crabtree Hot Spring	SMU;UM;USGS	06/03/92	-30.8	2.53	0.94	-7.80
CLH96-3	Duncan Soda Spring	USGS	08/21/96	nc	nc	nc	-10.0
CL91-9	Ettawa Spring	SMU;UM;USGS	03/08/91	-58.9	-7.69	1.13	-7.79
CL91-24	Gas Spring	SMU;UM;USGS	03/12/91	-54.8	-6.79	4.80	-13.82
CL95-7	Gas Spring	SMU;USGS	04/01/95	-54.8	-6.79	nc	-12.9
CL91-20	Gordon Cold Spring	SMU;UM	03/11/91	-55.1	-8.02	5.78	nc
CL92-43	Gordon Cold Spring	SMU;UM	06/04/92	-54.4	-8.79	6.09	nc
CL91-21	Gordon Warm Spring	SMU;UM;USGS	03/11/91	-54.6	-7.13	0.20	-9.86
CL91-16	Grizzly Spring	SMU;UM;USGS	03/09/91	-36.5	0.14	0.61	-4.67
CL92-32	Grizzly Spring	SMU;USGS	06/02/92	-29.7	1.37	nc	-5.91
CL95-8	Grizzly Spring	SMU;DB	07/17/95	-40.0	-1.80	nc	-5.5
CL91-4	Hog Hollow Spring	SMU;UM;USGS	03/07/91	-61.7	-7.68	0.27	-11.77
CL92-35	Hog Hollow Spring	SMU	06/02/92	-59.9	-8.21	nc	nc
CL95-16	Hog Hollow Spring	SMU;DB	07/24/95	-61.0	-8.30	nc	-10.3
CL95-14	Horseshoe Spring	SMU;DB	07/23/95	-55.0	-7.61	nc	-8.3
GYS95-2	Hot Springs Creek	SMU	08/08/95	-47.0	-6.49	nc	nc
CL93-50	Hough Spring	SMU;UM	05/06/93	-63.9	-8.98	2.24	nc
CL91-26	Howard Spring	SMU;UM;USGS	03/13/91	-54.4	-6.24	0.00	-9.20
CL91-11	Joe's Spring	SMU;UM	03/08/91	-60.7	-6.96	1.67	nc
CL93-72	Little Borax Lake	SMU	12/07/93	-27.2	-3.41	nc	nc
GYS95-3	Little Geysers	SMU	08/08/95	-26.0	2.62	nc	nc
SBM95-9	Little Soda Spring	USGS	09/13/95	-54.0	-7.97	nc	nc
CLH96-6	Lucchetti "Bad Water" Well	USGS	08/22/96	nc	nc	nc	-11.1
CL92-30	Mayfield Well	SMU;UM;USGS	06/02/92	-55.0	-8.84	1.37	-9.55
CL91-18	New Ciardella Well	SMU;UM	03/11/91	-62.5	-9.10	0.00	nc
CL93-49	New Ciardella Well	SMU	05/05/93	-54.4	-8.84	nc	nc
CL91-23	Newman Spring I	SMU;UM;USGS	03/12/91	-35.2	2.49	0.32	-7.48
CL92-38	Newman Spring II	SMU;USGS	06/03/92	-46.3	-4.52	nc	-8.32
GYS95-1	Old Geysers	SMU	08/08/95	-29.0	-1.19	nc	nc
CL92-41	Pinnacle Rock Spring	SMU;UM	06/03/92	-61.1	-9.30	5.53	nc
CLH96-1	Reeve's 2 Well	USGS	08/21/96	nc	nc	nc	-18.6
CL91-10	Spiers Spring	SMU;UM;USGS	03/08/91	-50.1	-5.86	2.97	-8.82

Table 5: Continued

Sample No.	Location	Laboratory^b	Date	δD-H₂O (‰)	$\delta^{18}O$-H₂O (‰)	3H-H₂O (T.U.)	$\delta^{13}C$-DIC (‰)
CL91-22	Sulphur Creek Spring	SMU;UM;USGS	03/11/91	-55.0	-7.13	3.97	-12.47
CL95-12	Sulphur Creek Spring	SMU;DB	07/19/95	-54.0	-6.89	nc	-9.9
CLH96-2	Tribal 1 Well	USGS	08/21/96	nc	nc	nc	-11.1
CLH96-5	Vintage Well	USGS	08/22/96	nc	nc	nc	-22.8
<i>Anderson Springs Area</i>							
CL91-19	Anderson Hot Spring	SMU;UM;USGS	03/11/91	-49.3	-7.35	4.62	-15.1
CL92-44	Anderson Hot Spring	SMU	06/04/92	-45.9	-6.31	nc	nc
CL95-2	Anderson Hot Spring	SMU;DB	03/30/95	-45.9	-6.31	nc	-10.4
CL98-3	Anderson Hot Spring	USGS	09/10/98	-47.2	-7.48	nc	nc
CL98-5	Anderson Hot Spring	USGS	12/04/98	-46.2	-7.42	nc	nc
And99-2	Anderson Hot Spring	USGS;UM	08/19/99	-47.7	-7.56	2.45	nc
CL98-2	Anderson, New Hot Spring	USGS	09/10/98	-48.3	-7.57	nc	nc
And99-4	Anderson, New Hot Spring	USGS	08/20/99	-46.7	-7.40	nc	nc
No number	Anderson, New Hot Spring	USGS	09/16/99	-49.1	-7.52	nc	nc
And99-3	Fe-rich Spring	USGS;UM	08/19/99	-47.2	-7.44	2.20	nc
CL98-4	Schwartz Mine Adit	USGS	12/04/98	-47.2	-7.64	nc	nc
And99-6	Schwartz Mine Adit	USGS;UM	08/20/99	-44.0	-7.84	2.55	nc
And99-8	Schwartz Mine Adit	USGS	10/05/99	-48.9	-8.04	nc	nc
<i>Sulphur Bank Mine Area</i>							
SB99-2	Basalt (North) Pit	USGS	08/17/99	-9.3	3.67	nc	nc
SB99-1	Basalt (North) Pit Spring	USGS	08/17/99	-39.2	-3.87	nc	nc
SB99-15	Clear Lake, Middle Rip Rap, SBM	USGS	08/18/99	-37.0	-4.4	nc	nc
SBM97-3	Clear Lake, N. Rip Rap, SBM	WM;UM	11/11/97	-22.0	-3.90	3.25	nc
SB99-13	Clear Lake, N. Rip Rap, SBM	USGS;UM	08/18/99	-35.3	-4.50	3.12	nc
SBM95-4	Clear Lake, S. Rip Rap, SBM	USGS	09/11/95	-33.0	-3.80	nc	nc
SBM97-4	Clear Lake, S. Rip Rap, SBM	WM;UM	11/11/97	-23.0	-3.70	3.24	nc
SB99-16	Clear Lake, S. Rip Rap, SBM	USGS	08/18/99	-35.0	-4.28	nc	nc
SB99-17	Green Pool	USGS	08/19/99	-8.5	3.55	nc	nc
SBM97-1	Herman Pit, east end	WM;UM	11/11/97	-28.0	-1.30	3.31	nc
SB99-11	Herman Pit, east end	USGS	08/17/99	-27.7	-1.48	nc	nc
CL93-56	Herman Pit, east end, 30 m W. of 55	SMU;UM	12/04/93	-19.8	0.91	4.47	nc
SB99-10	Herman Pit, site 4, near leaking well	USGS;UM	08/17/99	-27.8	-1.52	2.98	nc
SBM95-5	Herman Pit, west end	USGS	09/11/95	-25.0	-0.73	nc	nc
SBM97-2	Herman Pit, west end	WM;UM	11/11/97	-21.0	-1.20	3.30	nc
SB99-9	Herman Pit, west end	USGS	08/17/99	-27.5	-1.58	nc	nc
SB99-12	Rip-Rap Seep	USGS;UM	08/18/99	-33.9	-4.25	3.13	nc
CL95-15	"Sister of Green Bubbling Pool"	SMU	07/24/95	-24.0	0.22	nc	nc
SBM95-3	Well CL #1, leaking geothermal fluid	USGS	09/11/95	-25.0	5.24	nc	nc
SBMM00-5	Well CL #1, leaking geothermal fluid	UA;UM ^c	12/01/00	-28.0	4.20	0.00	nc
<i>Sulphur Creek Mining District</i>							
CL93-66	Blanck Hot Spring	SMU;UM	12/05/93	-31.4	2.53	1.35	nc
CL93-65	Elbow Hot Spring	SMU;UM	12/05/93	-15.0	8.68	0.00	nc
CL95-10	Elbow Hot Spring	SMU;DB	07/18/95	-18.0	8.41	nc	-5.3
CL96-3	Elbow Hot Spring	USGS	06/15/96	nc	nc	nc	-5.5
CL93-67	Elgin Hot Spring Main	SMU;UM	12/06/93	-20.7	6.58	0.29	nc
CL96-1	Elgin Hot Spring Main	USGS	06/15/96	nc	nc	nc	-5.7
CL91-12	Jones Hot Spring	SMU;UM;USGS	03/09/91	-22.6	6.99	0.49	-5.06
CL92-34	Jones Hot Spring	SMU;USGS	06/02/92	-17.5	6.98	nc	-4.99
CL95-6	Jones Hot Spring	SMU;DB	04/01/95	-24.0	5.63	nc	-5.0
CL96-5	Jones Hot Spring	USGS	06/16/96	nc	nc	nc	-5.6
CL93-47	Turkey Run Mine Spring	SMU;UM	05/05/93	-55.0	-5.40	1.15	nc
CL95-5	Turkey Run Mine Spring	SMU;DB	04/01/95	-56.0	-5.91	nc	-7.1
CL91-13	Wilbur Hot Spring, Main	SMU;UM;USGS	03/09/91	-25.2	6.01	0.23	-5.73
CL92-33	Wilbur Hot Spring, Main	SMU;UM;USGS	06/02/92	-21.6	6.20	0.00	-6.01

Table 5: Continued

Sample No.	Location	Laboratory ^b	Date	$\delta D\text{-H}_2O$ (‰)	$\delta^{18}O\text{-H}_2O$ (‰)	$^3H\text{-H}_2O$ (T.U.)	$\delta^{13}C\text{-DIC}$ (‰)
CL95-9	Wilbur Hot Spring, Main	SMU;DB	07/18/95	-27.0	4.57	nc	-5.7
CL96-4	Wilbur Hot Spring, Main	USGS	06/15/96	nc	nc	nc	-6.1

^anc = sample not collected for the analysis in question.

^bStable isotopes of water analyzed by Southern Methodist University (SMU), Western Michigan University (WM), or USGS; all tritium samples analyzed by University of Miami (UM); carbon isotopes of dissolved inorganic carbon analyzed by USGS or D. Bergfeld (DB). See text for discussion of methods.

^cStable isotopes and tritium analyzed by University of Arizona and University of Miami, respectively; data provided by Tetra Tek (Rancho Cordova, California).

Table 6: Gas geochemistry of gas vents, fumaroles, and gaseous springs in The Geysers-Clear Lake region, California (analytical values in mol% dry gas).^a

Sample No.	Location/Comments	Laboratory ^b	Date	Temp. °C	CO ₂	H ₂ S	H ₂	CH ₄	C ₂ H ₆	N ₂	NH ₃
<i>The Geysers - Clear Lake Region, General Locations</i>											
CL92-37	Allen Spring	LANL	06/03/92	17.0	87.5	0.000	0.000	0.010	na	9.80	0.0020
CL91-5	Baker Soda Spring	LANL	03/07/91	21.3	98.8	0.000	0.000	0.714	na	0.392	0.0002
CL96-6	Baker Soda Spring	USGS	06/17/96	22.2	98.5	<0.0001	0.00031	0.924	0.0006	0.473	<0.0001
SBM95-8	Big Mother Spring (lake water strips CO ₂)	USGS	09/13/95	26.0	2.95	0.304	0.00432	53.0	na	41.3	nd
CL91-2	Big Soda Spring	LANL	03/06/91	31.3	99.8	0.000	0.000	0.146	0.0008	0.014	0.0003
CL92-42	Big Soda Spring	LANL	06/04/92	31.0	99.7	0.000	0.000	0.252	na	0.053	0.0002
CL91-28	Borax Lake Gas Seep	LANL	03/14/91	10.0	85.4	0.014	0.000	13.4	0.0000	1.144	0.0007
CL91-28	Borax Lake Gas Seep (air contamination)	LANL(FT)	03/14/91	10.0	19.8	<0.0005	<0.0002	3.53	0.0022	60.4	nd
CL93-71	Borax Lake Gas Seep	USGS	12/27/93	24.2	79.3	0.093	0.0038	18.4	na	2.17	0.0009
CL95-4	Borax Lake Gas Seep	USGS	03/31/95	11.3	75.5	0.125	0.0021	22.3	na	1.88	0.00383
CL93-68	Chalk Mountain	USGS	12/17/93	17.0	99.6	0.236	0.0002	0.00612	na	0.126	0.0010
CLH96-4	Coppage Spring (isotopes on gas only)	USGS	08/22/96	19.0	na	na	na	na	na	na	na
CL92-39	Crabtree Gas Seep	LANL	06/03/92	28.0	94.1	0.000	0.0014	1.269	na	4.64	0.0005
CL95-13	Crabtree Gas Seep	USGS	07/21/95	29.0	93.1	0.010	0.0041	1.360	na	5.34	0.00067
CLH96-3	Duncan Soda Spring	USGS	08/21/96	16.0	98.2	<0.0001	0.00014	0.233	na	1.27	nd
CL91-24	Gas Spring	LANL	03/12/91	10.0	96.2	0.000	0.0000	1.107	0.0000	2.81	0.0003
CL97-1	Gas Spring	USGS	06/13/97	17.1	95.4	0.005	<0.0001	1.205	na	3.28	<0.0001
CL91-16	Grizzly Spring	LANL	03/09/91	19.4	98.3	0.000	0.000	1.11	0	0.289	0.0001
CL95-8	Grizzly Spring	USGS	07/17/95	21.5	98.0	0.068	0.00012	1.20	na	0.738	0.00114
CL97-6	Grizzly Spring	LANL	06/18/97	22.0	93.0	0.067	<0.0007	5.79	0.00139	1.16	<0.0006
CL98-1	Highland Springs Reservoir	LANL	09/09/98	22.3	87.7	0.006	0.030	10.6	0.0974	1.448	<0.0008
CL91-4	Hog Hollow Spring	LANL(FT)	03/07/91	30.0	84.7	<0.0005	<0.0002	1.23	0.0026	10.8	na
CL95-16	Hog Hollow Spring	USGS	07/24/95	31.0	98.3	<0.0001	0.00014	1.35	na	0.264	0.00082
CL97-5	Hog Hollow Spring	LANL	06/18/97	30.1	98.2	<0.001	<0.0002	1.232	0.00294	0.443	<0.003
CL95-14	Horseshoe Spring	USGS	07/23/95	40.0	93.5	0.004	0.00343	2.28	na	2.90	0.00094
CL97-4	Horseshoe Spring	LANL	06/18/97	40.8	99.0	<0.001	<0.0001	0.241	0.00000	0.439	<0.003
GYS95-2	Hot Springs Creek	USGS	08/08/95	95.2	56.5	1.29	20.6	9.39	na	9.40	0.00039
CL91-26	Howard Spring	LANL	03/13/91	46.3	99.7	0.000	0.001	0.06	0.0000	0.204	0.0001
CL91-7	Kelseyville Methane Well	LANL(FT)	03/08/91	10.4	66.9	<0.0005	<0.0002	27.0	0.0718	5.73	na
CL95-1	Kelseyville Methane Well	USGS	03/30/95	13.7	64.7	0.021	0.0163	31.1	na	3.93	0.00748
CL97-3	Kelseyville Methane Well	LANL	06/17/97	nm	68.7	<0.005	<0.003	27.5	0.0532	3.73	<0.003
GYS95-3	Little Geysers	USGS	08/08/95	97.6	51.2	4.68	10.9	1.03	na	27.4	0.230
GYS95-4	Little Geysers in Stream	USGS	08/08/95	95.8	56.6	5.34	15.7	1.37	na	15.5	0.866
CLH96-6	Lucchetti Well	USGS	08/22/96	19.5	97.3	0.000	0.00026	0.882	na	1.72	nd
GYS95-1	Old Geysers	USGS	08/08/95	40.5	83.6	2.19	5.22	6.57	na	2.26	0.00026
CL91-10	Spiers Spring	LANL(FT)	03/08/91	24.2	82.8	<0.0005	0.000	0.024	<0.0002	14.2	nd
CL91-22	Sulphur Creek Spring	LANL	03/11/91	21.0	97.5	0.383	0.000	0.791	0.0017	1.023	0.0004
CL95-12	Sulphur Creek Spring	USGS	07/19/95	29.0	98.7	0.760	0.00047	0.0526	na	0.494	<0.0001
CL95-11	Sulphur Mound Mine	USGS	07/19/95	20.0	91.2	1.33	0.00145	6.17	na	1.24	0.00185

Table 6: Continued

Sample No.	Location/Comments	Laboratory ^b	Date	Temp. °C	CO ₂	H ₂ S	H ₂	CH ₄	C ₂ H ₆	N ₂	NH ₃
CL97-2A	Sulphur Mound Mine	LANL	06/17/97	nm	91.5	1.29	<0.0007	5.71	0.00645	1.42	<0.0005
CL97-2B	Sulphur Mound Mine	LANL	06/17/97	nm	91.6	1.32	<0.0007	5.68	0.00570	1.45	<0.0007
<i>Anderson Springs Area</i>											
CL91-19	Anderson Hot Spring (air contamination) ^d	LANL(FT)	03/11/91	49.4	82.1	0.351	0.135	5.19	0.039	10.1	nd
CL92-44	Anderson Hot Spring (air contamination)	LANL(FT)	06/04/92	48.0	22.3	0.001	0.000	0.53	na	60.8	0.0057
CL95-2	Anderson Hot Spring	USGS	03/30/95	76.6	90.5	2.91	0.0289	3.85	na	2.55	0.00177
And99-1a	Anderson, New Hot Spring	LANL	08/19/99	98.4	64.5	4.85	5.50	1.151	0.0121	22.5	0.286
And99-1b	Anderson, New Hot Spring	LANL	08/19/99	98.4	49.4	3.71	4.31	0.802	0.0092	35.8	0.717
<i>Sulphur Bank Mine Area</i>											
SBM95-6	Basalt (North) Pit, south end	USGS	09/12/95	25.0	76.3	0.013	<0.0001	18.2	na	4.33	nd
SB99-2	Basalt (North) Pit, south end, geysering spring	LANL	08/17/99	22.1	86.0	<0.005	0.0056	10.6	0.0042	2.56	0.0012
CL93-59	Dry vent on embankment near leaking well	USGS	12/17/93	23.8	90.3	0.328	0.003	7.52	na	1.78	0.0034
SB99-5	Dry vent 30 m E of leaking geothermal well	LANL	08/17/99	35.4	90.9	0.278	0.0017	6.96	0.0009	1.89	<0.0005
SB99-7	Dry vent, by E end of crib, leaking well	LANL	08/17/99	32.2	90.7	0.175	<0.001	6.93	0.0018	2.04	<0.0007
SBMM00-1	Dry vent adjacent to leaking well	LANL	12/01/00	13.3	90.6	0.206	0.009	7.20	<0.0009	1.82	<0.002
SBMM00-2	Dry vent at base of embankment nr leaking well	LANL	12/01/00	34.8	92.8	0.351	0.023	5.61	<0.0007	1.18	<0.002
CL93-64	Frog Pond (Green Bubbling Pool)	USGS	12/21/93	22.7	87.6	0.004	0.000	9.67	na	2.52	0.0057
SBM95-7	Frog Pond (Green Bubbling Pool)	USGS	09/12/95	25.6	82.6	<0.0001	0.00037	9.76	na	6.08	nd
SB99-8	Green Pool	LANL	08/17/99	22.2	90.1	<0.003	<0.001	7.82	0.0020	1.99	0.0007
CL91-1A	Herman Pit, bubbling vent near site 4	LANL	03/06/91	10.1	86.6	0.033	0.000	10.5	0.0000	2.66	0.0018
CL91-1B	Herman Pit, bubbling vent near site 4	LANL	03/06/91	10.1	87.1	0.017	0.000	9.98	0.0000	2.56	0.0010
CL93-55	Herman Pit bubbling vent on east end	USGS	12/22/93	22.8	88.4	0.109	0.007	9.14	na	2.28	0.0044
CL93-56	Herman Pit, bubbling vent 30 m W of #55	USGS	12/04/93	14.0	88.8	0.184	0.0017	8.89	na	2.23	0.00074
CL93-57	Herman Pit, bubbling vent 25 m W. of 56	USGS	12/22/93	23.5	90.3	0.296	0.003	7.76	na	1.78	0.0002
CL93-58	Herman Pit, bubbling vent at site 4	USGS	12/27/93	23.5	88.3	0.119	0.003	9.08	na	2.31	0.0037
CL93-60	Herman Pit, bubbling vent 35 m W of #58	USGS	12/04/93	14.0	84.0	0.119	0.00066	8.80	na	5.93	0.0020
CL93-62	Herman Pit, weak bubbling vent 75 m W. of 61	USGS	12/27/93	23.7	89.8	0.211	0.000	8.00	na	1.94	0.0007
SBM95-1	Herman Pit, bubbling vent 45 m W of leaking well	USGS	09/11/95	23.4	89.9	0.259	0.00149	7.98	na	1.87	nd
SB99-4	Herman Pit, large bubbling vent near site 4	LANL	08/17/99	24.4	89.0	0.116	0.0011	8.48	<0.002	2.30	<0.0006
SB99-6	Herman Pit, bubbling vent ~50 m E of leaking well	LANL	08/17/99	24.4	89.5	0.152	<0.001	8.13	<0.001	2.24	<0.0006
CL95-15	"Sister of Green Bubbling Pool"	USGS	07/24/95	26.0	86.7	0.030	0.0048	10.4	na	2.52	0.0199
CL93-61	Well CL #1, leaking geothermal fluid	USGS	12/21/93	22.6	92.6	0.280	0.080	5.81	na	1.21	0.0024
SBM95-3 (2)	Well CL #1, leaking geothermal fluid	USGS	09/11/95	27.0	92.8	0.472	0.0583	5.42	na	1.18	nd
SB99-3	Well CL #1, leaking geothermal fluid	LANL	08/17/99	31.4	92.8	0.253	0.0160	5.25	0.0021	1.56	<0.001
SBMM00-4	Well, flowing gas 150 m N of Herman Pit	LANL	12/01/00	cold	92.7	0.310	0.004	5.68	<0.0007	1.26	<0.002
SBMM00-3	Well MW25D, gas bleed, 60 psig WHP	LANL	12/01/00	cold	92.6	0.014	<0.0007	5.60	0.0014	1.56	<0.002

Table 6: Continued

Sample No.	Location/Comments	Laboratory ^b	Date	Temp. °C	CO ₂	H ₂ S	H ₂	CH ₄	C ₂ H ₆	N ₂	NH ₃
<i>Sulphur Creek Mining District</i>											
CL93-65	Elbow Hot Spring	USGS	12/27/93	72.0	95.5	1.92	0.470	1.89	na	0.170	0.0009
CL95-10	Elbow Hot Spring	USGS	07/18/95	70.5	95.6	1.93	0.300	1.61	na	0.586	0.0002
CL96-3 (1)	Elbow Hot Spring	USGS	06/15/96	73.0	95.8	1.83	0.267	1.82	na	0.296	0.00010
CL93-67	Elgin Mine, Main Spg	USGS	12/06/93	69.0	97.1	2.09	0.00794	0.752	na	0.071	0.00034
CL96-1	Elgin Mine, Main Spg	USGS	06/15/96	67.0	97.0	2.12	0.00697	0.639	na	0.214	nd
CL97-7	Elgin Mine, Main Spg	LANL	06/20/97	67.6	97.0	2.11	0.006	0.650	0.00169	0.229	<0.003
CL91-12	Jones Hot Spring ^c	LANL(FT)	03/09/91	61.9	47.2	0.600	0.108	51.1	0.103	2.28	na
CL91-12	Jones Hot Spring	LANL	03/09/91	61.9	40.7	0.369	0.035	51.9	0.147	6.76	0.0024
CL92-34	Jones Hot Spring	LANL	06/02/92	57.0	53.3	0.976	0.184	44.0	na	2.22	0.149
CL96-5 (1)	Jones Hot Spring	USGS	06/16/96	57.0	46.8	0.853	0.121	49.9	na	2.34	nd
CL96-5 (2)	Jones Hot Spring	USGS	06/16/96	57.0	48.5	1.082	0.140	48.1	na	2.03	0.0211
CL95-9	Wilbur Hot Spring	USGS	07/18/95	56.5	91.1	3.14	0.00107	4.88	na	0.838	0.00186
CL96-4 (1)	Wilbur Hot Spring	USGS	06/16/96	56.0	83.8	3.16	0.00125	2.87	na	10.0	0.00095
CL96-4 (2)	Wilbur Hot Spring	USGS	06/16/96	56.0	85.4	3.16	0.00279	2.89	na	8.45	nd

^ana = not analyzed; nd = not detected; nm = not measured.^bBulk gas analyses were performed at either LANL or the U.S. Geological Survey (USGS) using methods described in text; FT = flow through gas bottle for sample collection; all others collected in caustic gas bottles.^cCarbon isotopes on CO₂ extracts were analyzed at either the USGS or Geochron Laboratories (Cambridge, Massachusetts) using methods described in text. Carbon isotopes on CH₄ extracts were analyzed at the USGS.^dPropane plus butane = 0.0178 mol%.^ePropane plus butane = 0.0225 mol%.

Table 6: Continued

Sample No.	Ar	He	O ₂	CO	As	Hg	Sb	Se	Total (mol %)	$\delta^{13}\text{C}-\text{CO}_2^c$	$\delta^{13}\text{C}-\text{CH}_4^c$
<i>The Geysers - Clear Lake Region, General Locations</i>											
CL92-37	0.118	0.0005	2.65	na	na	0.00000015	na	na	100.05	-12.8	na
CL91-5	0.0062	0.0022	0.110	na	na	na	na	na	100.00	-10.5	na
CL96-6	0.00654	0.0003697	0.137	na	na	na	na	na	100.00	-11.0	-33.2
SBM95-8	0.259	0.00249	1.96	na	na	na	na	na	99.72	-18.6	-41.5
CL91-2	0.0005	0.0000	0.0029	na	na	na	na	na	100.00	-11.9	na
CL92-42	0.0012	0.0000	0.0181	na	na	<0.00000004	na	na	100.00	na	na
CL91-28	0.000	0.000	0.000	na	na	na	na	na	99.94	-11.3	na
CL91-28	0.774	0.0012	16.2	<0.001	na	na	na	na	100.78	-5.6?	na
CL93-71	0.0111	0.0012	0.0370	na	na	<0.00000004	na	na	99.94	-11.0	na
CL95-4	0.00907	0.0044	0.0381	na	na	na	na	na	99.86	-11.1	-30.2
CL93-68	0.0037	0.0000	0.0022	na	na	<0.00000004	na	na	100.00	-13.2	na
CLH96-4	na	na	na	na	na	na	na	na	na	-13.3	-72.7
CL92-39	0.0016	0.0008	0.0355	na	na	<0.00000004	na	na	100.03	-11.3	na
CL95-13	0.00568	0.00159	0.106	na	na	na	na	na	99.93	-11.1	-37.4
CLH96-3	0.0322	0.000046	0.304	na	na	na	na	na	100.00	-13.3	-43.2
CL91-24	0.000	0.000	0.000	na	na	na	na	na	100.07	-12.3	na
CL97-1	0.00427	0.0001921	0.0691	na	na	na	na	na	99.99	-11.6	-37.3
CL91-16	0.0073	0.0000	0.293	na	na	na	na	na	100.01	-10.5	na
CL95-8	0.0206	nd	0.00663	na	na	na	na	na	100.03	-11.7	-31.2
CL97-6	0.0223	<0.0007	0.0753	<0.0007	0.000016	<0.0000001	na	na	100.07	-13.2	na
CL98-1	0.0061	0.0010	0.0353	<0.002	0.0000162	<0.0000004	na	na	99.94	-9.2	na
CL91-4	0.135	0.0004	2.85	<0.001	na	na	na	na	99.68	-12.7	na
CL95-16	0.0116	nd	0.0807	na	na	na	na	na	100.00	-13.2	-30.9
CL97-5	0.0138	<0.0002	0.162	<0.0002	0.000001	<0.0000001	na	na	100.02	-13.2	na
CL95-14	0.0627	0.000976	1.24	na	na	na	na	na	99.99	-11.7	-35.5
CL97-4	0.0103	<0.0001	0.266	<0.0001	0.000002	<0.0000001	na	na	100.01	-12.8	na
GYS95-2	0.191	0.00294	3.17	na	na	na	na	na	100.52	-12.6	-40.3
CL91-26	0.0049	0.0000	0.078	na	na	na	na	na	100.00	-12.4	na
CL91-7	0.0293	0.0016	0.660	<0.001	na	na	na	na	100.42	-10.5	na
CL95-1	0.00653	0.00277	0.165	na	na	na	na	na	99.95	-10.8	-28.5
CL97-3	0.013	<0.003	0.113	<0.003	0.000035	<0.0000004	na	na	100.12	-11.9	na
GYS95-3	0.404	nd	4.21	na	na	na	na	na	99.98	-14.3	-37.7
GYS95-4	0.338	0.00363	4.11	na	na	na	na	na	99.82	-13.6	-32.1
CLH96-6	0.028	0.000979	0.0490	na	na	na	na	na	100.01	-12.1	-53.5
GYS95-1	0.048	0.00109	0.0159	na	na	na	na	na	99.95	-12.5	-35.8
CL91-10	0.177	0.0006	3.70	<0.001	na	na	na	na	100.85	-12.8	na
CL91-22	0.021	0.0000	0.0246	na	na	na	na	na	99.70	-12.4	na
CL95-12	0.0120	0.00018	0.00577	na	na	na	na	na	100.00	-13.3	-68.6
CL95-11	0.0122	0.00165	0.00345	na	na	na	na	na	99.96	-11.6	-32.1

Table 6: Continued

Sample No.	Ar	He	O ₂	CO	As	Hg	Sb	Se	Total (mol %)	δ ¹³ C-CO ₂ ^c (‰)	δ ¹³ C-CH ₄ ^c (‰)
CL97-2A	0.0122	0.0009	0.0021	<0.0007	0.000013	<0.0000001	na	na	99.99	-12.6	na
CL97-2B	0.0142	0.0016	0.0085	<0.0007	0.000017	0.0000002	na	na	100.04	-12.5	na
<i>Anderson Springs Area</i>											
CL91-19	0.120	0.001	1.76	<0.001	na	na	na	na	99.83	-13.3	na
CL92-44	0.699	0.000	16.0	na	na	na	na	na	100.35	na	na
CL95-2	0.0424	nd	nd	na	na	na	na	na	99.88	-12.3	-32.6
And99-1a	0.305	<0.003	0.780	<0.003	0.0002092	0.0004321	nd	nd	99.90	-12.5	na
And99-1b	0.452	<0.005	5.12	<0.005	0.0001936	0.0003067	nd	nd	100.30	-12.6	na
<i>Sulphur Bank Mine Area</i>											
SBM95-6	0.0319	0.000624	1.03	na	na	na	na	na	99.90	-10.2	-41.4
SB99-2	0.029	0.0028	0.891	<0.002	0.0000057	<0.0000001	nd	nd	100.03	-9.8	na
CL93-59	0.0069	0.0000	0.0761	na	na	<0.0000004	na	na	100.05	-10.6	na
SB99-5	0.0122	0.0017	0.0113	<0.0009	0.0000097	0.0000004	nd	nd	100.05	-10.2	na
SB99-7	0.0153	0.0289	0.0253	<0.0009	0.0000112	0.0000006	nd	nd	99.89	-10.2	na
SBMM00-1	0.0127	<0.0009	0.0082	<0.0009	0.0000044	<0.0000001	0.000011	<0.00001	99.88	na	na
SBMM00-2	0.0028	0.0007	0.0021	<0.0007	0.0000079	<0.0000001	0.000010	<0.000005	99.95	na	na
CL93-64	0.0130	0.0000	0.202	na	na	<0.0000004	na	na	99.99	-9.9	na
SBM95-7	0.0545	0.0009797	1.60	na	na	na	na	na	100.05	-9.6	-37.4
SB99-8	0.0089	<0.001	0.140	<0.001	0.0000062	0.0000002	nd	nd	100.01	-10.3	na
CL91-1A	0.0107	0.020	0.0801	na	na	na	na	na	99.93	-9.7	na
CL91-1B	0.0153	0.008	0.155	na	na	na	na	na	99.86	na	na
CL93-55	0.0147	0.0022	0.119	na	na	<0.0000004	na	na	100.10	-10.6	na
CL93-56	0.00866	0.000808	0.0352	na	na	<0.0000004	na	na	100.15	-10.3	-32.0
CL93-57	0.0050	0.0010	0.0102	na	na	<0.0000004	na	na	100.11	-10.5	na
CL93-58	0.0127	0.0011	0.123	na	na	<0.0000004	na	na	99.93	-10.5	na
CL93-60	0.0567	0.00072	0.977	na	na	<0.0000004	na	na	99.89	-10.2	-31.6
CL93-62	0.0106	0.0004	0.0166	na	na	<0.0000004	na	na	100.02	-10.7	na
SBM95-1	0.00863	0.000578	0.0109	na	na	na	na	na	100.02	-11.1	-42.7
SB99-4	0.0161	<0.002	0.0322	<0.002	0.0000122	0.0000005	nd	nd	99.98	-10.0	na
SB99-6	0.0155	0.0031	0.0970	<0.001	0.0000110	0.0000005	nd	nd	100.15	-9.9	na
CL95-15	0.0126	0.00305	0.238	na	na	na	na	na	99.93	-10.9	-29.9
CL93-61	0.0061	0.0003	0.0164	na	na	1.01E-07	na	na	99.99	-10.6	na
SBM95-3 (2)	0.00827	0.000376	0.00561	na	na	na	na	na	99.97	-11.1	-45.2
SB99-3	0.0139	0.0007	0.0104	<0.0007	0.0000077	<0.0000001	nd	nd	99.89	-10.6	na
SBMM00-4	0.0042	<0.0007	0.0028	<0.0007	0.0000054	0.0000002	0.000009	<0.000005	99.97	na	na
SBMM00-3	0.0058	<0.0007	0.075	<0.0007	0.0000137	<0.0000001	0.000013	<0.000006	99.90	na	na

Table 6: Continued

Sample No.	Ar	He	O ₂	CO	As	Hg	Sb	Se	Total (mol %)	$\delta^{13}\text{C-CO}_2^c$ (‰)	$\delta^{13}\text{C-CH}_4^c$ (‰)
<i>Sulphur Creek Mining District</i>											
CL93-65	0.0043	0.0000	0.0049	na	na	0.00000046	na	na	99.99	-9.7	na
CL95-10	0.0108	0.000076	0.00124	na	na	na	na	na	99.99	-9.9	-53.8
CL96-3 (1)	0.00765	0.000071	0.00257	na	na	na	na	na	100.00	-9.7	-65.4
CL93-67	0.00177	0.000033	0.000184	na	na	0.00000008	na	na	100.02	-9.6	-31.8
CL96-1	0.00472	0.000036	0.00180	na	na	na	na	na	100.00	-9.7	-30.1
CL97-7	0.0052	<0.0001	0.00089	0.00009	<0.000001	<0.0000001	na	na	100.00	-9.9	na
CL91-12	0.0118	0.0013	0.144	<0.001	na	na	na	na	101.49	-9.0	na
CL91-12	0.0353	0.0000	0.0943	na	na	na	na	na	99.99	-10.7	na
CL92-34	0.0000	0.0000	0.0000	na	na	0.00000015	na	na	100.78	-9.7	na
CL96-5 (1)	0.0203	0.00391	0.0334	na	na	na	na	na	100.07	-10.0	-38.7
CL96-5 (2)	0.0145	0.00592	0.0313	na	na	na	na	na	99.95	-10.0	na
CL95-9	0.0216	nd	0.00331	na	na	na	na	na	99.99	-10.8	-25.0
CL96-4 (1)	0.136	0.0006177	nd	na	na	na	na	na	99.94	-11.1	na
CL96-4 (2)	0.127	0.000133	0.0227	na	na	na	na	na	100.02	-10.7	-31.5

Table 7: Estimated subsurface reservoir temperatures using a standard suite of chemical geothermometers (values in °C). Data used in calculations come from Tables 3 (water) and 6 (gas).

Italicized values mean that a "less than" number was replaced by an equivalent real number to make the calculation. Bold numbers are averaged calculations from the same site; nc = no calculation possible; nm = not measured.

Sample No.	Location	Measured (°C)	Am. Silica ^a	Chalcedony ^a	Quartz Cond. ^a	Na/K ^a (Fournier)	Na-K-Ca ^b (β=4/3)	Na-K-Ca ^b (β=1/3)	Na-K-Ca ^c (Mg-Corr.)	Na/Li ^d	Mg/Li ^e	K/Mg ^f	D-P ^g	H ₂ -Ar ^h	CO ₂ -CH ₄ ⁱ
The Geysers - Clear Lake Region, General Locations															
CL91-8	Ag. Park Well #3	65.7	53	154	176	306	(154)	229	40	229	90	93			
CL92-37	Allen Spring	17	15	108	135	128	61	(115)	61	238	66	26	54	30	309
CL91-5	Baker Soda Spring	21.3	11	102	130	198	(263)	205	Cool	130	100	102	50	120	159
CL92-29	Baker Soda Spring	23.6	11	103	131	196	(263)	204	Cool	122	96	102			
CL96-6	Baker Soda Spring	22.2											66	82	149
	Ave. Baker Soda Spring	22.4	11	102	130	197		204	Cool	126	98	102	58	101	154
SBM95-8	Big Mother Spring	26											105	51	(124)
CL91-2	Big Soda Spring	31.3	32	129	154	234	73	(168)	Cool	185	42	45	56	196	216
CL92-42	Big Soda Spring	31	35	132	157	206	65	(153)	65	190	45	40	54	169	197
	Ave. Big Soda Spring	31.1	33	131	155	220	69		Cool	187	43	42	55	182	206
CL91-28	Borax Lake Gas Seep	10.0											89	nc	47
CL93-71	Borax Lake Gas Seep	24.2											123	142	33
CL95-4	Borax Lake Gas Seep	11.3											116	131	24
	Ave. Borax Lake Gas Seep	15.1											109	136	35
CL93-70	Borax Lake	10	-130	-77	-46	156	(555)	217	33	12	80	136			
CL91-17	Chalk Mt. Spring	16.1	17	110	137	222	(273)	220	Cool	172	101	96			
CL92-31	Chalk Mt. Spring	21	21	115	141	228	(274)	224	Cool	164	96	97			
CL93-68	Chalk Mt. Spring	17											120	82	331
	Ave. Chalk Mt. Spring	18.0	19	112	139	225		222	Cool	168	92	110	120	82	331
CL91-15	Complexion Spring	8.9	-54	20	53	128	(689)	205	105	-53	-15	157			
CL92-36	Complexion Spring	19.1	-29.0	53	84	131	(2589)	251	251	66	238	380			
	Ave. Complexion Spring	14.0	0	36	68	129		228	178	7	111	268			
CLH96-4	Coppage Spring	19	-1	88	117	114	39	(100)	39	2	-13	21			
CL92-39	Crabtree Gas Seep	28											40	171	136
CL95-13	Crabtree Gas Seep	29											117	165	133
	Ave. Crabtree Gas Seep	28											78	168	134
CL92-40	Crabtree Hot Spring	42	52	153	175	105	(164)	129	Cool	138	96	61			
CLH96-3	Duncan Soda Spring	16											62	10	199
CL91-9	Ettawa Spring	21.7	19	113	140	104	(112)	116	Cool	80	40	36			
CL91-24	Gas Spring	10.0											36	nc	142
CL97-1	Gas Spring	17.1											92	131	138
	Ave. Gas Spring	13.6											64	131	140
CL91-21	Gordon Warm Spring	34.6	47	147	170	188	75	(149)	Cool	138	31	36			
CL91-16	Grizzly Spring	19.4	12	104	131	100	(189)	131	Cool	96	72	54	36	115	142
CL92-32	Grizzly Spring	20.9	24	119	145	110	(199)	139	Cool	100	72	57			
CL95-8	Grizzly Spring	21.5											79	17	140
CL97-6	Grizzly Spring	22.0											103	81	81
	Ave. Grizzly Spring	20.9	18	111	138	105		135	Cool	98	72	55	73	71	121
CL98-1	Highland Springs Reservoir	22.3											94	224	57
CL91-4	Hog Hollow Spring	30.0	38	136	161	177	75	(144)	49	136	54	54	50	26	133
CL92-35	Hog Hollow Spring	29.1	31	128	153	186	82	(151)	48	135	57	59			
CL95-16	Hog Hollow Spring	31.0											56	41	135
CL97-5	Hog Hollow Spring	30.1											48	95	139
	Ave. Hog Hollow Spring	30.0	34	132	157	181	78		48	135	55	56	51	54	136

Table 7: Continued

Sample No.	Location	Measured (°C)	Am. Silica ^a	Chalcedony ^a	Quartz Cond. ^a	Na/K ^a (Fournier)	Na-K-Ca ^b (β=4/3)	Na-K-Ca ^b (β=1/3)	Na-K-Ca ^c (Mg-Corr.)	Na/Li ^d	Mg/Li ^e	K/Mg ^f	D-P ^g	H ₂ -Ar ^h	CO ₂ -CH ₄ ⁱ
CL95-14	Horseshoe Spring	40.0											69	87	115
CL97-4	Horseshoe Spring	40.8											54	104	198
Ave. Horseshoe Spring		40.4											62	95	156
GY95-2	Hot Springs Creek	95.2											232	317	45
CL91-26	Howard Hot Spring	46.3	41	140	164	204	(131)	175	Cool	192	55	48	60	130	250
CL91-7	Kelseyville Methane Well	10.4											16	72	13
CL95-1	Kelseyville Methane Well	13.7											59	203	7
CL97-3	Kelseyville Methane Well	nm											16	98	13
Ave. Kelseyville Well		12.1											30	124	11
CL93-72	Little Borax Lake	11	-72	-3	31	361	(297)	294	Cool	38	18	99			
GY95-3	Little Geysers	97.6											256	275	122
GY95-4	Little Geysers in Stream	95.8											263	292	115
SBM95-9	Little Soda Spring	32.0	31	128	153	230	(131)	188	Cool	185	44	46	29	33	150
CLH96-6	Lucchetti Well	19.5													
CL91-23	Newman Spring I	29.0	49	150	172	117	(158)	135	Cool	260	133	61			
CL92-38	Newman Spring II	29	34	131	156	114	(121)	124	Cool	246	104	45			
GY95-1	Old Geysers	40.5											268	317	72
CL91-10	Spiers Spring	24.2	39	137	162	150	(127)	146	Cool	152	54	41	79	31	275
CL91-22	Sulphur Creek Spring	21	35	133	157	208	(120)	174	Cool	206	56	46	126	82	154
CL95-12	Sulphur Creek Spring	29.0											135	77	253
Ave. Sulphur Creek Spring		25	35	133	157	208		174	Cool	206	56	46	131	79	203
CL95-11	Sulphur Mound Mine	20.0											133	110	78
CL97-2A	Sulphur Mound Mine	nm											127	99	81
CL97-2B	Sulphur Mound Mine	nm											127	94	81
Ave. Sulphur Mound Mine		20											129	101	80
<i>Anderson Springs Area</i>															
CL91-19	Anderson Hot Spring	49.4	9	100	128	307	45	(184)	45	182	30	48	218	179	80
CL92-44	Anderson Hot Spring	48.0	-4	84	114	294	48	(180)	48	205	36	47	(38)	(24)	116
CL95-2	Anderson Hot Spring	76.6											205	163	95
CL98-3	Anderson Hot Spring	68.0	2	92	120	256	57	(170)	57	196	45	50			
CL98-5	Anderson Hot Spring	50.4	-13	73	103	260	48	(168)	48	186	36	45			
And99-2	Anderson Hot Spring	69.5	3	93	122	273	61	(179)	61	188	44	54			
Ave Anderson Hot Spring		60.3	0	88	117	278	52		52	191	38	49	211	171	88
CL98-2	Anderson, New Hot Spring	90.4	-2	86	115	236	54	(161)	54	82	15	49			
And99-1a	Anderson, New Hot Spring	98.4											229	263	126
And99-1b	Anderson, New Hot Spring	98.4											230	244	129
And99-4	Anderson, New Hot Spring	98.4	3	93	122	236	67	(167)	67	92	30	61			
No number	Anderson, New Hot Spring	99.5	7	98	127	222	65	(160)	65	36	5	54			
Ave. New Hot Spring		97	3	92	121	231	62		62	70	17	55	229	254	127
<i>Sulphur Bank Mine Area</i>															
CL93-59	Dry gas vent, HP area	23.8											133	150	70
SB99-5	Dry gas vent, HP area	35.4											122	116	73
SB99-7	Dry gas vent, HP area	32.2											110	92	73
SBMM00-1	Dry gas vent, HP area	13.3											148	165	72

Table 7: Continued

Sample No.	Location	Measured (°C)	Am. Silica ^a	Chalcedony ^a	Quartz Cond. ^a	Na/K ^a (Fournier)	Na-K-Ca ^b (β=4/3)	Na-K-Ca ^b (β=1/3)	Na-K-Ca ^c (Mg-Corr.)	Na/Li ^d	Mg/Li ^e	K/Mg ^f	D-P ^g	H ₂ -Ar ^h	CO ₂ -CH ₄ ⁱ	
SBMM00-2	Dry gas vent, HP area	34.8											173	240	82	
	Ave. Dry Vent, HP Area	27.9											137	153	74	
	Ave. Peripheral Gas Vent ^j	23.9											63	90	55	
CL91-1A	Herman Pit, near site 4	10.1											96	103	57	
CL91-1B	Herman Pit, near site 4	10.1											91	92	59	
CL93-54	Herman Pit, east end	23.5	3	93	122	143	101	(135)	Cool	171	82	56	136	151	62	
CL93-55	Herman Pit bubbling vent	22.8														
CL93-56	Herman Pit, east end	14	3	93	122	146	99	(136)	Cool	173	81	55	118	126	64	
CL93-57	Herman Pit, bubbling vent	23.5														
CL93-58	Herman Pit, bubbling vent	23.5														
CL93-60	Herman Pit, bubbling vent	14.0														
CL93-62	Herman Pit, bubbling vent	23.7														
SBM95-1	Herman Pit, east end	23.4	1	91	119	146	94	(135)	Cool	173	79	54	119	122	68	
SBM97-1	Herman Pit, east end	17.2	1	91	119	151	94	(137)	Cool	182	80	54				
SB99-4	Herman Pit, bubbling vent	24.4														
SB99-6	Herman Pit, bubbling vent	24.4														
SB99-11	Herman Pit, east end	24.8	-2	87	116	153	92	(137)	Cool	176	76	54				
SB99-10	Herman Pit, site 4	24.8	-2	87	116	152	91	(137)	Cool	174	76	53				
SBMM00-6	Herman Pit, site 4	13.1	1	90	119	152	95	(138)	Cool	173	78	56				
CL93-63	Herman Pit, west end	14	1	91	120	146	99	(136)	Cool	174	81	56				
SBM95-5	Herman Pit, west end	26.0	1	90	119	144	93	(133)	Cool	174	79	53				
SBM97-2	Herman Pit, west end	17.6	2	92	120	153	93	(138)	Cool	189	81	54				
SB99-9	Herman Pit, west end	24.8	-1	88	117	152	91	(137)	Cool	174	76	53				
	Ave. Herman Pit	20.3	1	90	119	149	95		Cool	176	79	54	113	110	64	
CL93-61	Well CL #1	22.6												198	253	80
SBM95-3	Well CL #1	27.0	15	108	135	147	(134)	147	71	170	123	87	197	234	83	
SB99-3	Well CL #1	31.4												163	179	84
SBMM00-5	Well CL #1	13.6	27	122	148	143	(110)	138	83	192	123	80				
	Ave. Well CL #1	23.7	21	115	141	145		143	77	181	123	83	186	222	82	
SBMM00-4	Well, flowing gas	cold												139	175	81
SBMM00-3	Well MW25D	cold												92	122	82
	Ave. Peripheral Well	cold												116	148	81
Sulphur Creek Mining District																
CL93-66	Blanck Hot Spring	43	24	119	146	174	(723)	246	61	85	137	147				
SC94-10	Blanck Hot Spring	44	29	125	151	170	(721)	239	55	83	136	145				
CLJ95-9	Blanck Hot Spring	36	25	120	146	164	(634)	228	43	87	134	138				
	Ave. Blanck Hot Spring	41	26	121	148	169		238	53	85	136	143				
CL93-51	Elbow Hot Spring	70	-12	74	104	158	(1077)	248	232	262	218	203				
CL93-65	Elbow Hot Spring	72	-1	88	117	170	(1198)	261	251	271	225	213	283	318	122	
SC94-13	Elbow Hot Spring	74	6	97	125	159	(942)	243	225	266	217	201				
CL95-10	Elbow Hot Spring	70.5														
CLJ95-8	Elbow Hot Spring	74	1	91	120	163	(943)	246	230	276	223	204				
CL96-3 (1)	Elbow Hot Spring	73.0														
	Ave. Elbow Hot Spring	72.3	0	88	117	163		249	234	269	221	205	272	292	125	
CL93-67	Elgin Hot Spring Main	69	38	136	160	177	(758)	247	143	259	167	172	183	221	156	
SC94-20	Elgin Hot Spring Main	70	41	140	164	173	(739)	242	134	256	164	169				

Table 7: Continued

Sample No.	Location	Measured (°C)	Am. Silica ^a	Chalcedony ^a	Quartz Cond. ^a	Na/K ^a (Fournier)	Na-K-Ca ^b (β=4/3)	Na-K-Ca ^b (β=1/3)	Na-K-Ca ^c (Mg-Corr.)	Na/Li ^d	Mg/Li ^e	K/Mg ^f	D-P ^g	H ₂ -Ar ^h	CO ₂ -CH ₄ ⁱ
SC94-19	Elgin, Orange Bathtub	63	26	122	147	172	(811)	246	179	253	177	181	181	187	162
CL96-1	Elgin Hot Spring Main	67.0											177	178	161
CL97-7	Elgin Hot Spring Main	67.6													
	Ave. Elgin Hot Springs	67.3	35	133	157	174		245	152	256	169	174	180	195	160
CL91-12	Jones Hot Spring	61.9	11	103	131	168	(710)	237	104	272	166	162	110	242	(23)
CL92-34	Jones Hot Spring	57	6	97	125	158	(738)	231	99	260	164	159	121	333	(13)
SC94-12	Jones Hot Spring	58	10	101	129	160	(708)	231	85	266	160	155			
CL96-5 (1)	Jones Hot Spring	57.0											115	229	(22)
CL96-5 (2)	Jones Hot Spring	57.0											119	244	(19)
CL95-6	Jones Hot Spring	56.2	10	101	129	169	(688)	236	63	284	155	149			
CL95-Oct95	Jones Hot Spring	55	12	105	132	165	(768)	239	99	273	166	160			
	Ave. Jones Hot Spring	57.4	10	101	129	164		235	90	271	162	157	116	262	20
CL93-47	Turkey Run Mine Spring	29	8	99	127	135	(144)	143	Cool	120	51	42			
SC94-16	Turkey Run Mine Spring	28	3	93	122	134	(156)	144	Cool	108	52	47			
CL95-5	Turkey Run Mine Spring	29	3	92	121	145	(140)	147	Cool	119	49	45			
	Ave. Turkey Run Spring	29	5	95	123	138		145	Cool	116	51	45			
SC94-2	Unnamed Hot Spring	52	-11	76	106	157	(677)	227	209	265	214	198			
CL93-52	Wilbur Spring, DW site	57	42	141	165	156	(550)	216	56	247	144	146			
SC94-4	Wilbur Spring, DW site	58	56	158	179	167	(671)	234	76	270	154	152			
CLJ95-10	Wilbur Spring, DW site	54.5	52	153	175	162	(661)	229	75	270	155	150			
	Ave. Wilbur, DW site	56	50	151	173	162		226	69	262	151	149			
CL91-13	Wilbur Hot Spring, Main	55.6	56	158	180	169	(673)	235	74	270	153	152			
CL92-33	Wilbur Hot Spring, Main	55.3	63	166	187	158	(707)	229	76	257	156	153			
SC94-5	Wilbur Hot Spring, Main	57	56	159	180	165	(713)	235	79	269	156	153			
CL95-9	Wilbur Hot Spring, Main	57											137	84	86
CL96-4 (1)	Wilbur Hot Spring, Main	56											144	32	102
CL96-4 (2)	Wilbur Hot Spring, Main	56											159	59	103
	Ave. Wilbur Main	56.1	58	161	182	164		233	76	265	155	153	147	58	97
CL93-53	Wilbur, betw main and rd	55	52	153	175	156	(670)	225	59	248	145	147			

^aAmorphous silica, chalcedony, quartz (conductive), and Na/K equations from Fournier (1981).^bNa-K-Ca equations from Fournier and Truesdell (1973); see their paper for an explanation of the "beta" factor; parentheses mean that the calculation violates rules of application.^cNa-K-Ca (Mg correction) equation from Fournier and Potter (1979); "cool" means <70°C.^dNa/Li equation of Fouillac and Michard (1981).^eMg/Li equation of Kharaka and Mariner (1989).^fK/Mg equation of Giggenbach (1986).^gCO₂-H₂S-H₂-CH₄ gas equations of D'Amore and Panichi (1980); parentheses mean value is ignored for averaging.^hH₂-Ar equation of Giggenbach (1992); parentheses mean value is ignored for averaging.ⁱCO₂-CH₄ equation of Norman and Bernhardt (1981).^jAverage of six gas samples from North Pit, Frog Pond, Green Pond, and "Sister of Green Bubbling Pool."

Table 8: XRF chemical analyses of rock units in The Geysers-Clear Lake region, California (does not include LOI; analyses by E. Kluk, LANL).

Sample	F91-1	F91-2	F91-3	F91-4	F91-5	F91-6	F91-7	F91-8	F91-9	
Rock Type ^a	Rhyo-obsidian	Basalt	Dacite	Andesite	Basalt	Dacite	Dacite	Rhyolite	Dacite	
Unit Name ^a	Borax Lake	Arrowhead Rd	Clearlake Park	Sulphur Bank	Roundtop Mtn	Soda Bay	Konocti Bay	Thurston Crk	Plum Flat	
Map Location	A	B	C	D	E	F	G	H	I	
Major elements (wt %)	Average Error (+/- wt %)									
SiO ₂	1.55	76.03	54.95	60.35	55.07	54.53	67.00	64.62	74.19	67.18
TiO ₂	0.02	0.066	1.368	1.067	1.275	1.105	0.474	0.675	0.276	0.456
Al ₂ O ₃	0.35	12.42	15.11	14.36	17.56	16.60	15.05	15.11	13.07	13.56
Fe ₂ O ₃	0.12	0.99	8.80	6.91	7.68	7.21	3.17	4.20	1.59	3.11
MnO	0.01	0.019	0.147	0.115	0.129	0.124	0.055	0.076	0.029	0.054
MgO	0.11	0.10	5.58	4.32	4.68	6.30	2.06	3.33	0.23	2.63
CaO	0.12	0.56	8.34	6.51	7.25	8.62	3.75	5.06	1.11	3.44
Na ₂ O	0.08	3.58	2.95	3.15	3.01	3.03	3.49	3.59	3.57	3.22
K ₂ O	0.04	4.70	1.67	2.40	1.19	1.01	3.17	2.41	4.60	3.13
P ₂ O ₅	0.01	0.014	0.202	0.160	0.178	0.216	0.110	0.175	0.033	0.118
Total majors (wt %)		98.36	99.12	99.35	98.02	98.75	98.33	99.24	98.70	96.89
Trace elements (ppm)	(+/- ppm)									
V	16.46	0.0	179	132	159	162	49.4	74.3	10.0	49.6
Cr	14.16	0.0	137	104	137	242	41.6	74.0	0.0	88.0
Ni	6.19	0.0	30.2	26.4	15.7	31.1	13.3	29.9	0.0	47.8
Zn	10.23	41.6	48.4	63.7	72.0	46.4	37.4	35.1	24.3	35.5
Rb	5.35	215	55.6	95.1	33.4	27.6	111	78.6	194	109
Sr	8.36	0.0	233	173	305	480	338	545	73.4	459
Y	3.57	43.8	35.2	38.0	22.4	21.0	29.4	24.9	36.2	26.5
Zr	11.38	85.4	126	120	137	132	141	171	192	149
Nb	4.85	10.9	12.8	13.2	10.1	11.2	7.0	13.1	12.0	6.7
Ba	30.12	47.6	141	99.3	360	403	552	452	634	440
Total w/traces wt %		98.41	99.25	99.46	98.18	98.94	98.49	99.42	98.84	97.06

^aRock types and unit names from Hearn et al. (1995).

^bTotal Major % for F92-40 includes 12.8% loss on ignition.

Table 8: Continued

Sample	F91-10	F91-11	F91-12	F91-13	F91-14	F91-15	F91-16	F91-17	F91-18	F91-19
Rock Type ^a	Andesite	Andesite	Dacite	Dacite	Andesite	Dacite	Dacite	Dacite	Andesite	Rhyolite
Unit Name ^a	High Valley	Clearlake Oaks	Cache Crk	Diener Drive	Perini Hill	Siegler Mtn	Mt. Hannah	Cobb Valley	Split Top Ridge	Bonanza Spgs
Map Location	J	K	L	M	N	O	P	Q	R	S
<u>Major elements (wt %)</u>										
SiO ₂	55.96	56.94	65.92	69.77	64.09	68.12	69.15	64.86	65.00	71.75
TiO ₂	0.910	1.203	0.613	0.348	0.606	0.529	0.427	0.589	0.625	0.315
Al ₂ O ₃	16.96	17.04	14.78	14.38	16.71	14.80	15.10	17.14	16.90	14.12
Fe ₂ O ₃	7.20	7.12	3.74	2.81	4.81	3.32	3.04	4.11	4.04	2.09
MnO	0.123	0.124	0.061	0.049	0.082	0.057	0.056	0.055	0.070	0.033
MgO	5.41	4.64	2.60	1.54	2.75	1.52	1.18	2.50	2.07	-0.10
CaO	7.64	7.93	4.16	2.88	3.77	2.72	3.05	1.69	4.07	1.62
Na ₂ O	2.80	3.47	3.29	3.78	3.26	3.29	3.47	3.01	3.52	4.10
K ₂ O	1.30	1.33	3.16	3.43	2.27	3.36	3.37	2.79	2.54	3.49
P ₂ O ₅	0.174	0.183	0.157	0.078	0.169	0.153	0.094	0.122	0.151	0.021
Total majors (wt %)	98.48	99.98	98.48	99.06	98.53	97.87	98.93	96.86	98.99	97.54
<u>Trace elements (ppm)</u>										
V	138	166	66.5	41.1	89.7	52.5	49.3	61.8	95.7	0.0
Cr	228	133	71.1	39.8	90.2	31.2	15.2	114.3	12.2	0.0
Ni	22.4	0.0	17.1	18.8	22.8	13.3	0.0	52.8	0.0	0.0
Zn	61.2	58.5	32.1	28.5	46.7	34.3	32.3	66.5	38.0	50.8
Rb	35.0	41.7	105	110	40.4	116	124	102	79.4	105
Sr	414	326	386	273	540	394	293	327	453	257
Y	21.4	27.6	29.2	29.1	27.9	41.3	32.7	15.4	48.1	27.4
Zr	146	125	158	195	170	160	133	158	165	217
Nb	10.0	8.0	12.5	9.4	8.1	10.8	9.0	7.6	7.0	11.7
Ba	387	260	497	1000	1071	623	942	866	798	1157
Total w/traces wt %	98.66	100.12	98.64	99.26	98.78	98.04	99.12	97.08	99.19	97.75

Table 8: Continued

Sample	F91-20	F92-29	F92-31	F92-32	F92-33	F92-34	F92-35	F92-36	F92-37
Rock Type ^a	Basalt	Chert	Serpentine	Graywacke	Rhyolite	Dacite	Greenstone	Graywacke	Graywacke
Unit Name ^a	McIntyre Crk	Franciscan	Sheared Serpentinite	Great Valley Seq	Alder Creek	Cobb Mtn	Franciscan	Franciscan	Great Valley Seq
Map Location	T	U	V	W	X	Y	Z	AA	BB
<u>Major elements (wt %)</u>									
SiO ₂	57.95	96.38	54.18	71.08	69.97	66.84	48.86	72.25	70.14
TiO ₂	1.757	0.041	0.085	0.462	0.355	0.716	1.226	0.587	0.598
Al ₂ O ₃	16.46	0.90	3.22	12.31	14.35	15.89	15.41	11.50	13.64
Fe ₂ O ₃	9.34	0.75	3.78	4.56	2.72	3.88	10.10	4.77	6.25
MnO	0.086	0.089	0.162	0.066	0.046	0.060	0.160	0.071	0.061
MgO	1.63	0.14	21.74	2.25	1.27	1.14	6.01	2.34	2.23
CaO	5.36	0.00	10.25	2.93	2.52	3.69	12.83	1.60	1.11
Na ₂ O	4.10	0.20	0.34	3.10	3.24	3.71	2.99	2.85	2.94
K ₂ O	1.92	0.05	0.04	0.85	3.91	2.97	0.15	1.64	0.93
P ₂ O ₅	0.395	0.021	0.015	0.056	0.094	0.161	0.129	0.098	0.055
Total majors (wt %)	99.00	98.57	93.81	97.66	98.47	99.06	97.87	97.70	97.94
<u>Trace elements (ppm)</u>									
V	224	6.9	85.2	123	50.1	45.9	285	108	130
Cr	0.0	0.0	1491	175	15.6	0.0	129	179	50.3
Ni	0.0	15.0	147	31.5	7.4	4.6	52.8	68.4	26.8
Zn	84.4	13.3	16.6	50.0	39.2	54.6	48.6	61.6	63.9
Rb	57.5	0.0	0.0	17.5	170	119	0.0	58.4	23.5
Sr	348	6.9	5.7	251	302	343	21.4	163	112
Y	73.5	6.1	5.5	13.2	21.1	26.2	29.9	15.9	18.0
Zr	198	13.0	0.0	121	122	150	75.5	128	90.7
Nb	15.2	0.0	0.0	3.9	9.2	9.8	8.0	10.5	0.0
Ba	591	47.7	24.5	306	649	625	274	832	493
Total w/traces wt %	99.19	98.58	94.06	97.80	98.63	99.22	97.99	97.89	98.07

Table 8: Continued

Sample	F92-38	F92-39	F92-40 ^b	MG37C	MG218B	MG743	MG-76-142
Rock Type ^a	Andesite	Shale	Serpentine	Blueschist Knocker	Graywacke	Metabasalt	Greenstone
Unit Name ^a	Perini Hill	Knoxville Fm	Massive Serpentinite	Franciscan	Great Valley Seq	Franciscan	Franciscan
Map Location	CC	DD	EE	FF	GG	HH	II
<u>Major elements (wt %)</u>							
SiO ₂	62.92	26.18	41.85	52.86	60.14	38.06	43.77
TiO ₂	0.638	0.419	0.00	1.091	0.860	3.520	3.273
Al ₂ O ₃	16.19	6.64	0.50	13.90	17.72	12.73	14.99
Fe ₂ O ₃	4.88	4.08	7.62	10.30	8.73	12.64	10.24
MnO	0.079	1.660	0.13	0.180	0.086	0.169	0.232
MgO	3.70	1.83	37.13	8.17	2.13	3.85	9.33
CaO	5.12	40.84	0.27	5.85	1.93	19.74	10.85
Na ₂ O	3.08	0.87	0.00	4.25	3.44	2.81	1.70
K ₂ O	2.36	1.08	0.00	1.08	2.18	0.55	2.86
P ₂ O ₅	0.163	0.211	0.00	0.104	0.152	0.529	0.753
Total majors (wt %)	99.13	83.81	100.3	97.78	97.37	94.59	97.99
<u>Trace elements (ppm)</u>							
V	112	102	na	267	214	301	265
Cr	106	99.2	na	247	114	29.9	233
Ni	46.2	57.9	na	137	56.0	34.8	67.6
Zn	58.9	47.1	na	74.5	134	93.8	61.4
Rb	52.7	39.0	na	35.5	67.5	5.9	60.1
Sr	688	354	na	141	249	867	436
Y	18.8	21.3	na	24.9	26.4	39.1	38.2
Zr	156	83.8	na	74.1	149	287	306
Nb	9.6	11.7	na	5.7	10.8	44.2	75.3
Ba	768	216	na	118	484	138	620
Total w/traces wt %	99.38	83.94		97.93	97.55	94.83	98.26

Table 9: Miscellaneous strontium and oxygen isotope data for selected rocks in The Geysers-Clear Lake region, California. F-samples are keyed to map (Figure 1) and SCL-samples can be located using the geologic map of Hearn et al., 1995.^a

Sample No.	Description	$^{87}\text{Sr}/^{86}\text{Sr}$ (W/R)	$\delta^{18}\text{O}$ (W/R) ^b (‰)
F91-1	Borax Lake Obsidian	0.70484	10.4
F91-2	Arrowhead Rd Basalt	na	8.3
F91-3	Clearlake Park Dacite	na	9.5
F91-4	Sulphur Bank Andesite	na	8.8
F91-5	Roundtop Mtn Basalt	0.70383	8.4
F91-6	Soda Bay Dacite	0.70385	9.2
F91-7	Konocti Bay Dacite	na	8.4
F91-8	Thurston Creek Rhyolite	na	9.4
F91-9	Plum Flat Dacite	na	9.6
F91-10	High Valley Andesite	na	9.1
F91-11	Clearlake Oaks Andesite	na	10.1
F91-12	Cache Creek Dacite	na	9.4
F91-13	Diener Drive Dacite	na	9.6
F91-14	Perini Hill Andesite	na	10.2
F91-15	Siegler Mtn Dacite	na	9.3
F91-16	Mt. Hannah Dacite	na	9.2
F91-17	Cobb Valley Dacite	na	10.1
F91-18	Split Top Ridge Andesite	na	10.5
F91-19	Bonanza Springs Rhyolite	na	10.5
F91-20	McIntyre Creek Basalt	na	8.8
F92-29	Franciscan Chert	0.707231	20.7
F92-31	Sheared Serpentinite	0.705066	9.1
F92-32	Graywacke, GV Sequence	0.704177	10.6
F92-33	Alder Creek Rhyolite	na	9.8
F92-34	Cobb Mtn Dacite	na	8.7
F92-35	Franciscan Greenstone	0.70503	8.4
F92-36	Franciscan Graywacke	0.707928	14.0
F92-37	Graywacke, GV Sequence	0.705277	11.3
F92-38	Perini Hill Andesite	0.70411	na
F92-39	Shale, Knoxville Fm	0.706604	20.9
F92-40	Massive Serpentinite	0.705989	5.4
SCL-15	Gneissic xenolith, Roundtop Mtn Basalt	0.70599	12.3
SCL-21B	Xenolith, Perini Hill Andesite	na	10.0
SCL-23b	Schistose xenolith, Perini Hill Andesite	0.70805	11.3
SCL-23d	Mafic cumulate, Perini Hill Andesite	na	9.7
SCL-48A	Konocti Basaltic Andesite	0.70341	7.2
SCL-69B	Mafic cumulate, Shaul Valley Dacite	na	8.1
SCL-71A	Mafic cumulate, Salmina Flat Andesite	na	9.7
SCL-88A	Schistose xenolith, Perini Hill Andesite	na	9.4
SCL-92	Butts Canyon Road Basalt	0.70312	na
SCL-97L	Quartz xenocryst, Hell's Half Acre Basalt	na	13.8
SCL-109	Vogensen Basaltic Andesite	0.70529	10.5
SCL-109Q1	Clear quartz xenocryst in SCL-109	na	14.2
SCL-109Q2	Milky quartz xenocryst in SCL-109	na	13.9
SCL-142A	Caldwell Pines Basalt	0.70308	7.2
SCL-166	Quartz-rich xenocryst, Roundtop Mtn	na	12.9

^aW/R = whole rock samples; na = not analyzed.

^bSrontium isotopes by J. Mattinson, University of California, Santa Barbara or C. Lesher, University of California, Davis; oxygen-18 isotopes from M. Colucci, Southern Methodist University or J. Stimac (unpub.).

Table 10: Metals analyses of stream sediments, mucks, and rocks from the Sulphur Creek mining district, Wilbur Springs region, California. All samples collected in May 1994. Values in ppm unless otherwise noted.^a

Sample No.	Location	Material	Weight (g)	Ag	Au	As	Be	Cd	Co	Cr
SC94-1	Sulphur Creek at unnamed hot spring	mud, sand, gravel	0.2038	0.34	<0.05	9.27	0.98	1.96	34.8	333
SC94-2	Unnamed Hot Spring	orifice muck	0.2138	0.29	1.46	3.81	0.94	1.64	41.2	398
SC94-4	Wilbur Springs, Don White's site	orifice muck	0.2038	<0.05	8.60	10.8	0.49	1.23	16.2	160
SC94-6	Sulphur Creek at Wilbur Springs	mud, sand, gravel	0.2047	0.24	0.08	11.8	1.22	1.95	44.7	45.7
SC94-7	Sulphur Creek below Wilbur Springs	mud, sand, gravel	0.2126	0.21	0.22	10.5	1.18	2.12	33.9	273
SC94-8	Fault gouge, Wilbur Springs gate	rock	0.2126	<0.05	<0.05	10.7	0.94	0.94	32.0	163
SC94-9	Sulphur Creek above Bear Creek	mud, sand, gravel	0.2061	0.15	<0.05	8.44	0.73	1.46	33.0	410
SC94-10	Blanck Hot Spring	orifice muck	0.2267	0.24	1.66	33.5	2.21	2.21	27.1	130
SC94-11	Sulphur Creek near Manzanita Mine	mud, sand, gravel	0.2020	0.29	<0.05	16.0	0.99	1.73	28.7	214
SC94-12	Jones Hot Spring	orifice muck	0.2139	0.16	4.00	11.8	3.27	0.94	42.1	566
SC94-13	Elbow Hot Spring	orifice muck	0.2400	0.13	17.4	6.25	1.25	0.83	56.7	575
SC94-14	Bear Creek upstream of Sulphur Crk	mud, sand, gravel	0.2152	0.07	<0.05	10.4	0.46	1.16	54.1	876
SC94-15	Bear Creek downstream of Sulphur Crk	mud, sand, gravel	0.2012	0.05	<0.05	10.5	0.50	1.24	52.4	862
SC94-16	Turkey Run Mine Spring	orifice muck	0.2073	0.07	<0.05	12.3	1.45	1.21	21.0	100
SC94-17a	Turkey Run, drainage near mine	mud, sand, gravel	0.2025	<0.05	0.25	8.27	0.49	1.23	89.4	812
SC94-17b	Ore, Turkey Run Mine	rock	0.2140	<0.05	0.04	0.56	0.23	<0.1	58.4	631
SC94-18	Turkey Run, drainage near highway	mud, sand, gravel	0.2048	0.10	<0.05	20.3	0.98	1.22	42.2	359
SC94-19	Elgin Mine Spring, orange bathtub	orifice muck	0.2106	0.17	<0.05	8.69	1.42	2.37	24.7	182
SC94-20	Elgin Mine, main hot spring	orifice muck	0.2042	0.17	4.91	3.43	1.71	2.20	16.4	109

^aSamples homogenized by mixing (and crushing if necessary). Aliquots were weighed, mixed with an acid cocktail of 2 ml HNO₃, 3.5 ml HCl, and 1.5 ml of HF, heated in a microwave, diluted to 50 ml with deionized water, and analyzed by methods described in Table 2. Blanks were used for analytical quality control.

Table 10: Continued

Sample No.	Cu	Hg	Mn	Ni	Pb	Sb	Se	V	Zn
SC94-1	53.7	16.9	736	469	13.1	17.4	0.47	161	111
SC94-2	50.2	126	688	566	12.3	11.5	0.33	146	111
SC94-4	52.4	22.1	424	145	13.3	15.0	0.07	73.4	107
SC94-6	53.0	141	838	493	32.4	10.0	0.73	169	111
SC94-7	49.0	8.00	762	421	11.1	4.23	0.32	185	101
SC94-8	20.2	0.52	1610	154	6.02	1.18	0.17	110	47.0
SC94-9	46.8	20.6	1030	371	9.31	7.28	0.35	164	101
SC94-10	62.7	22.5	889	138	15.0	63.1	0.40	170	132
SC94-11	52.6	0.94	790	339	10.9	1.49	0.32	181	109
SC94-12	41.8	157	701	608	20.6	23.4	0.35	118	211
SC94-13	44.3	229	950	1120	15.2	12.5	0.13	129	88.8
SC94-14	38.2	0.30	1030	1140	9.67	<0.5	0.19	203	90.8
SC94-15	37.9	12.9	984	1110	15.9	1.24	0.20	200	91.9
SC94-16	53.4	1.88	323	142	13.9	3.14	0.23	161	116
SC94-17a	30.9	37.5	447	2090	9.28	35.3	0.05	98.8	63.9
SC94-17b	3.82	80300	11.0	738	9.53	4.20	0.14	9.33	28.0
SC94-18	45.0	92.3	740	684	19.3	6.10	0.15	154	112
SC94-19	67.3	138	404	175	14.2	1.42	0.55	179	135
SC94-20	50.7	187	139	87.7	11.0	37.5	0.33	126	70.3

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